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ANALYSIS OF SURFACE SUBSIDENCE OF THE STRATEGIC
PETROLEUM RESERVE CRUDE OIL STORAGE SITES
FROM DECEMBER 1982 TO JANUARY 1988

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ABSTRACT

Surface elevation surveys have been made at five Strategic Petroleum Reserve oil storage sites at approximate one-year intervals beginning in 1982. The surveys have indicated significant surface subsidence rates at all sites, with maximum values varying from about -0.06 ft/yr at the Bryan Mound site to -0.30 ft/yr at the West Hackberry site. Thirty-year projections of the indicated subsidence rates suggest that surface subsidence could lead to surface flooding problems at the West Hackberry site and to a lesser degree at the Bayou Choctaw site. No such flooding problems are foreseen for the other three sites. However, subsidence rates at the Weeks Island site of up to -0.19 ft/yr are large enough to cause concern regarding possible salt fractures in the vicinity of shafts, which could in turn lead to water incursion into the mine.

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INTRODUCTION

The Strategic Petroleum Reserve (SPR) is a national program involving the underground storage of crude oil in large cavities in six separate salt domes in the Texas-Louisiana Gulf Coast area. The program involves the use of several converted brining caverns in salt domes with volumes up to 33 million barrels, one converted 75 million barrel salt mine, and several 10 million barrel caverns which have been or are in the process of being leached, especially for use in the program.

History has shown that both gradual subsidence and sometimes sudden collapse of the surface occur when underground cavities are developed by the extraction of salt, minerals, or other materials from natural underground locations. Cavern designs in the SPR program are such that collapse is not expected in the foreseeable future, though such a result cannot be positively ruled out. However, with the large volumes of salt which have been removed to form the underground caverns, it is fully expected that gradual surface subsidence will occur because of salt creep closure of the openings. Huge volumes of petroleum resources could be lost in the event of an unanticipated cavern collapse, and surface operational facilities could be severely damaged by modest subsidence in certain locations on the site. It was thus considered prudent to carefully monitor surface subsidence to determine if rates were sufficient to cause problems with surface facilities, and perhaps to give warning of the possible onset of cavern collapse.

To monitor surface subsidence, a series of elevation survey points was established around the surface of the sites, and a program was initiated in December 1982 for a survey at each site on an annual basis.

MONITORING PROCEDURE

Reference 1 includes a preliminary plan for monitoring subsidence at the SPR crude oil storage sites. A program for implementing the plan was prepared by PLT Engineering² for POSSI, the SPR Program Management and Operations contractor. The program was approved by the DOE SPR Project Management Office and the first on-site surveys were made at the Bryan Mound and Bayou Choctaw sites in December 1982. Subsequently, surveys have been made at each of the five oil storage sites at about one-year intervals as shown in the following:

Site	Dates of Surveys					
West Hackberry	01/83	08/83	02/84	03/85	09/86	12/87
Bryan Mound	12/82	08/83	01/84	03/85	11/86	09/87
Bayou Choctaw	12/82	11/83	01/84	02/85	09/86	01/88
Sulphur Mines	01/83	08/83	02/84	03/85	09/86	09/87
Weeks Island	05/83	11/83	03/84	10/84	04/86	06/87

Surveys for the Big Hill site were not included with the other five sites because leaching for oil storage cavern development did not begin until 1987. However, a baseline survey was made in 1987 and this site will be included in future surveys.

All surveys were made by licensed land surveyors under contract. Generally, the surveys at the different sites were done by different surveyors, and sequential site surveys were in many cases done by different surveyors. Contract specifications call for Second Order, First Class accuracy, with vertical closure not to exceed $6 \text{ mm} \times \text{km}^{0.5}$, and siting distance not to exceed 60 m (per J. M. McHenry, PB/KBB, New Orleans). This specification varies slightly from the federal standard for second order levelling accuracy,³ which is $0.035 \text{ ft} \times \text{miles}^{0.5}$. Specifications also called for extending each survey to the nearest existing bench mark.

SUMMARY OF ELEVATION SURVEY RESULTS

Elevations of each survey point defined by the surveyors during each survey are summarized in TABLE I-A through TABLE I-E. Included with the defined elevations are corresponding survey point names and/or descriptive locations, together with coordinates on north-south, east-west grids.

West Hackberry Site

Results from the West Hackberry vertical surveys are presented in TABLE I-A. The vertical control for these surveys was National Geodetic Survey Monument T-356 with an unadjusted 1981 elevation of 1.936 feet msl. This monument is located approximately two miles east and one **mile** south of the site. The monument is a brass disc set in concrete on the west side of Louisiana Highway 27 about 0.8 miles south of Louisiana Highway 390.

Bryan Mound Site

Results from the Bryan Mound vertical surveys are presented in TABLE I-B. The vertical control for the first three surveys was the U.S. Coast and Geodetic Survey (USC&GS) Monument **Y586-1942**. This monument was located roughly 3.2 miles northwest of the Bryan Mound site in the south end of the west abutment of the Highway 36 drawbridge over the Brazos River. Elevation of the monument was 15.04 feet msl according to a 1950-1951 survey. Between the surveys of 1/84 and 3/85, this monument was destroyed and it was necessary to use a different vertical control for the 3/85 and subsequent surveys. For these later surveys, the monument used was located at the Corps of Engineers pump station on the new Texas Highway 36 and Texas Highway 288 intersection about 2.2 miles northwest of the Bryan Mound site. The monument was a brass cap set in the southeast corner of the southwest **headwall** of the pump station, and was developed from USC&GS Monument P1274, which was established in 1978. Monument USC&GS P1274 has an established elevation of 16.96 feet msl and is located at the northeast corner of the Velasco Street bridge in the city of Freeport. The

3/85 and subsequent surveys generally gave individual elevations about 0.5 feet below values from previous surveys. With the relatively low subsidence rates, this result indicated the probability of a discrepancy between the elevations of the two vertical controls. Since the first monument was destroyed, it is not possible to resolve the discrepancy. However, it was possible to estimate the magnitude of the discrepancy analytically. The discrepancy estimated (0.48 feet) was the value which minimized standard errors in elevation and subsidence rate determined by linear regressions of all survey results. Corresponding adjustments were made to the 3/85 and subsequent survey results before calculating individual point subsidence rates included herein.

Bayou Choctaw Site

Results from the Bayou Choctaw vertical surveys are presented in TABLE I-C. The vertical control used was USC&GS Monument Z-208. This monument is located approximately 2.2 miles south and 3.3 miles east of the SPR site. It is a brass disc located in the south end of the west concrete wing wall of the south abutment of the abandoned railroad bridge over Bayou Plaquemine just west of state Highway 1 in the town of Plaquemine. Elevation of the monument is 26.35 feet msl according to a 1964-1965 survey.

Elevations from the 9/86 survey were consistently higher than elevations determined during earlier surveys. Gary Todd, P.E., of Sulphur, Louisiana, the contractor who did the 1986 survey, said they had to cut two-inch diameter vines in order to gain access to the monument for the 1986 survey. It is possible that the vines were large enough to obscure the brass disc during the earlier 2/85 survey, and that some point on the wing wall other than the disc was used for vertical control for the 2/85 survey. This could explain a consistent difference between the 2/85 and subsequent surveys. It was not possible to resolve the apparent discrepancy in elevations. However, it was possible to estimate the

magnitude of the discrepancy analytically as described above for the Bryan Mound data. This procedure indicated an increase in vertical control elevation of 0.20 feet between the **2/85** and the **9/86** surveys would result in minimum standard errors in measured elevations and subsidence rate. An adjustment corresponding to this change in reference elevation was made to measured elevations from the **9/86** and all subsequent surveys for defining subsidence rates.

Sulphur Mines Site

Results from all the Sulphur Mines vertical surveys are presented in TABLE I-D. The primary vertical control for the surveys was the USC&GS Monument **N161**. This monument is located about one mile south and 1.5 miles west of the Sulphur Mines site. The monument is set in the top of the west end of the south concrete **headwall** of a 5 x 10-foot box culvert under U.S. Highway 90. Elevation of the monument established in 1960 was 15.468 feet msl. A secondary vertical control, Louisiana Geodetic Survey Monument A4136, was used exclusively as a reference for the surveys of **3/85** and **9/86**. The reason for the change in vertical control for these two surveys is not known. No tie-in was made between the primary and secondary vertical controls during the surveys. A value of 14.96 feet msl was used for the elevation of the secondary vertical control, LGS Monument A4136, during the **3/85** survey. A value of 14.43 feet msl was used for this same vertical control monument during the **9/86** survey. Gary Todd of Sulphur, Louisiana, the contractor who did the **9/86** and **9/87** surveys, said the published elevation of the LGS Monument A4136 was definitely 14.43 during the **9/86** survey but that he believed the published elevation had been changed between the **3/85** and the **9/86** surveys. Elevations from the **9/86** survey were quite inconsistent with values from the other surveys. It was assumed that the actual elevation of the LGS Monument A4136 did not change between the **3/85** and **9/86** surveys, but rather that the published change was estimated from measured changes over a longer period of time. Based on this assumption, elevations for the **9/86** surveys were all increased by 0.53

foot to compensate for the published change in control elevation. This adjustment to the 9/86 elevations increased the consistency of this survey with the other surveys, and thus was used in analysis of the data to determine subsidence rates.

Weeks Island Site

Results from all the Weeks Island vertical surveys are presented in TABLE I-E. The vertical control for the surveys is located about one mile north and 1/2 mile east of the Weeks Island site. The monument is Disc 23V32, 1968, Louisiana Department of Highways (LDH) set in the north side of the west walkway of the Louisiana Highway 83 bridge over Bayou Warehouse. The elevation of the vertical control monument used during the 5/83, 11/83, 3/84, and 10/84 surveys was 12.139 feet msl. The elevation of this same vertical control used for the 4/86 and 6/87 surveys was 11.838 feet msl. Elevations from the 4/86 and 6/87 surveys were quite inconsistent with values from the earlier surveys. It was believed that the actual elevation of Monument Disc 23V32, 1968, LDH, did not change between the 10/84 and the 4/86 surveys, but rather that the published change was estimated from measured changes over a longer period of time. Based on this assumption, elevations for the 4/86 and 6/87 surveys were all increased by 0.30 foot to compensate for the change in control elevation. This adjustment to the 4/86 and 6/87 elevations increased the consistency of the surveys with the earlier surveys, and was therefore used in analysis of the data to determine subsidence rates.

ANALYSIS OF ELEVATION SURVEY RESULTS

Elevation survey results for each of the sites except West Hackberry were adjusted for actual and/or apparent discrepancies in elevations of vertical controls as described in the preceding section. Following these adjustments, linear regressions of the elevation versus time data at each survey point were made to determine rates of change of elevation with time

(surface subsidence rates). Results of these linear regressions for the different sites are summarized in TABLE II-A through TABLE II-E. In addition to subsidence rates, the tables include standard errors in the calculated subsidence rates and in the elevation measurements. As a frame of reference, averages of subsidence rates and standard errors at each of the sites are summarized below:

Site	Average Subsidence Rate (Ft/Yr)	Average Subsidence Rate (Ft/Yr)	Standard Error In: Elevation (Ft)
West Hackberry	-0.2052	0.0103	0.041
Bryan Mound	-0.0294	0.0096	0.031
Bayou Choctaw	-0.0615	0.0060	0.020
Sulphur Mines			
(Above Salt Dome)	-0.0954	0.0126	0.039
(Not Above Salt Dome)	-0.0403	0.0072	0.029
Weeks Island	-0.1142	0.0132	0.044

It is noted that the results for the Sulphur Mines site have been divided into two parts, one part for survey results above the salt dome and the other part for survey results not above the salt dome. Data for the other sites were all for locations above the salt dome.

The above results show a maximum average subsidence rate of 0.21 ft/yr for the West Hackberry site and a minimum average rate of 0.03 ft/yr for the Bryan Mound site. Considering a 30-year lifetime of the SPR program, these results indicate on the average a total subsidence of 6.3 feet at West Hackberry and of 0.9 feet at Bryan Mound. Subsidence of the magnitude indicated for West Hackberry could be expected to have important ramifications, whereas the magnitude indicated for Bryan Mound is probably of much less concern. The factor-of-seven difference between the West Hackberry and Bryan Mound average subsidence rate is surprising. It is

probably related at least in part to a much lower secondary creep rate for the Bryan Mound salt, which has been determined by laboratory tests.⁴ The fact that the average subsidence rate for the Bryan Mound site is less than that for the part of the Sulphur Mines site which is not above the salt dome is also surprising.

The average standard errors in elevation of 0.020 to 0.044 feet vary from considerably less than (in the case of Bayou Choctaw), to only slightly more than (in the case of Weeks Island) the allowable error in vertical closure of a "Second Order, First Class" survey. The quality of the survey results thus appear to be reasonable. Average standard errors in subsidence rate are generally consistent with errors in elevation and also appear reasonable, even though the error is 33 percent of the average rate in the case of Bryan Mound, where the rate is minimum.

While the average results are enlightening, the results in TABLE II clearly show considerable variation in subsidence rates across the sites. In order to visualize these variations, subsidence rate contours have been calculated for all sites with the exceptions of the Weeks Island site, and that part of the Sulphur Mines site which is not located above the salt dome. For calculating these contours, an x-y grid was established which encompassed all the survey points on the site. A subsidence rate was calculated at each intersection of the grid using subsidence rates determined for five nearby survey points. The calculation weighted each of the five selected points in proportion to the one-third power of distance of the point from the grid intersection. Interpolations were then made between subsidence rates at the grid intersections to determine locations at which specified subsidence rates occurred. Calculations were made under the direction of S. R. Dengler of the Geosciences Analysis Division, 6315, Sandia National Laboratories, Albuquerque, New Mexico.

DISCUSSION

Figures 1 through 4 are sketches of the cavern site layouts showing the locations of caverns and survey points for the subsidence surveys. Also included on the sketches are subsidence rate contour lines from the analysis described above. For Sulphur Mines, only the portion of the survey for the area above the salt dome is included in Figure 4. Figure 5 shows the general underground mine layout of the Weeks Island site together with locations of survey points for the subsidence surveys. Because the survey points are relatively few and widely scattered, it was not practical to try to construct subsidence rate contour lines. Instead, subsidence rates for single points and for groups of points are noted.

West Hackberry Site

Figure 1 is a subsidence rate contour map of the West Hackberry site. The map shows subsidence rates increasing in a northwesterly direction. Rates are generally -0.20 ft/yr, or greater, along the most northern part of the site, and a maximum rate of -0.30 ft/yr is shown in the vicinity of Cavern 115. Cavern **wellhead** flange elevations of about four to seven feet msl are common on this part of the site, and significant surface areas of the site are even lower.

Black Lake, which joins the site on the north edge, has a water level about two feet above msl and has expanded from four to more than 25 square miles of surface area during the period 1955 to 1980.5 An estimated three to five feet of subsidence has occurred between 1933 and 1978 to produce this expansion of surface area, much of which can probably be attributed to intensive hydrocarbon withdrawal that began about 1930. Local declines in groundwater associated with pumping probably also have contributed, as the groundwater head declined about 41 feet at Hackberry Village between 1952 and 1970.

Thirty-year projections of the subsidence rates of Figure 1 indicate additional subsidence of six to nine feet over large areas of the northern part of the site. Without mitigative measures, substantial local flooding will occur on this part of the site. Even without further subsidence, the generally low elevation and proximity to coastal flood surges associated with hurricanes makes the potential temporary flood hazard at this site of concern.

Bryan Mound Site

Figure 2 is a subsidence rate contour map of the Bryan Mound site. The map shows subsidence rate contours varying from 0.0 to -0.05 ft/yr, much less than values indicated for West Hackberry. There appears to be a slight tendency for subsidence rates to be greater over the southeastern part of the site. Minimum Bradenhead flange elevations of about five to ten feet msl are generally present for wells of caverns located on the north side of the site.

Sulphur mining from the **caprock** overlying Bryan Mound using the Frasch process produced some five million long tons between 1912 and 1935 from more than 2000 wells. The amount of total subsidence that has occurred is uncertain as accurate records are not available, but at least three to five feet is known to have occurred based on a comparison of modern and historical topographic maps.⁴

Thirty-year projections of the subsidence rates of Figure 2 indicate maximum additional subsidence of less than two feet. With this relatively small additional subsidence, it does not appear that significant potential flooding problems beyond those of the present are likely. The elevation of the lowest part of the site would remain at more than three feet msl and this lower elevation part of the site is protected from the open sea by an existing dike.

Bavou Choctaw Site

Figure 3 is a subsidence rate contour map of the Bayou Choctaw site. The map shows subsidence rate contours varying from -0.04 to -0.11 ft/yr, with rates increasing toward the southern part of the site. Minimum survey point elevations of less than five feet msl are present on the southern part of the site, although all wellheads are a few feet higher.

The low and generally swampy nature of this site is such that large surface areas are presently flooded during particularly rainy periods. With flooding being something of a problem now, it can be anticipated that subsidence projected 30 years into the future on the basis of the rates of Figure 3 will result in much more serious problems.

Cavern Lake, shown in Figure 3, resulted from the collapse of Cavern 7 in 1954 following leaching of domal salt upward to the salt-caprock interface.⁶ It is noted that subsidence rates in the vicinity of Cavern Lake are not abnormal or suggestive of present instabilities. Salt leaching in Cavern 4 was also continued upward to the salt-caprock interface and the cavern was abandoned in 1954. More recent sonar surveys of the cavern indicate the roof extends 40 feet above top of salt into the **caprock** zone. The structural integrity of this cavern is questionable to the extent that a cavern collapse warning system has been installed. However, the subsidence rates of Figure 3 in the vicinity of this cavern give no suggestion of instabilities.

Sulphur Mines Sites

Many of the survey points for the Sulphur Mines site were located in the vicinity of surface facilities which were not above the salt dome (TABLES I-D and II-D). For these points not above the dome, subsidence rates were -0.019 to -0.054 ft/yr, and subsidence rate contour maps were not attempted. Figure 4 is a subsidence rate contour map of the portion of the Sulphur Mines site overlying the salt dome where the storage caverns

are located. The map shows subsidence rates varying from -0.075 to -0.105 ft/yr, with maximum rates occurring near the middle of the DOE property between Caverns 6, 7, and the Cavern 2-4-5 gallery. Elevations of survey points above the dome are 11 to 19 feet msl, while survey points not above the dome are slightly higher at 15 to 23 feet msl.

The Sulphur Mines dome was the location of Herman Frasch's pioneering work in developing the steam extraction method of mining sulphur. Sulphur mining was carried out from 1902 to 1924 and some 9.4 million long tons were removed. After the beginning of sulphur extraction, surface subsidence began and it is known that some 20 feet of subsidence has occurred at some locations where mining was carried out. This surface subsidence, not related to the SPR caverns, is continuing at a rate of about -0.08 ft/yr, even though mining has been discontinued for nearly 65 years.⁸

Thirty-year projections of the subsidence rates of Figure 4 indicate maximum additional subsidence of 3.15 feet. This relatively small additional subsidence does not indicate any obviously severe problems due to further subsidence, but does not preclude the possibility that differential subsidence may effect surface piping and possibly other surface facilities.

Weeks Island Site

The oil storage cavity with a volume of about 75 million barrels at this site was a salt mine in which production was started in 1902 and continued up until the site was procured from Morton Salt Company in 1976. It is expected that subsidence at this site is primarily influenced by the large amount of salt removed. Some 230 million barrels of oil have been produced from the flanks of the dome,⁹ and this probably has a significant influence on surrounding surface subsidence but an insignificant effect on the SPR site surface subsidence.

With the existing distribution of survey points it is not possible to define subsidence rate contours as for the other sites. Figure 5 is a plan sketch of the upper and lower levels of the original mine in which oil is now stored, and in addition, of the Markel Mine and the New Morton Mine. Survey point locations are indicated on this plan sketch together with their subsidence rates. Generally, this figure indicates that subsidence rates are maximum where the survey points are above both the upper and lower levels of the mine, intermediate when they are above the lower level of the mine but not above the upper level, and minimum when they are above neither the upper or lower levels of the mine. USC&GS monument "Weeks 2," which was established in 1931, is located above the upper level of the mine about 600 to 900 feet northeast of the large group of similarly located survey points over the south center area of the upper level of the mine. Elevation measurements of this monument indicate a total subsidence of more than five feet since its installation. Elevation measurements of this monument during the two latest surveys indicate a subsidence rate of -0.171 ft/yr, comparable to other similarly located survey points. Thirty-year projections of the results of Figure 5 indicate additional subsidence of up to six feet. Additional subsidence of this magnitude will not lead to problems of surface flooding, in that survey point elevations are 44 to 131 feet msl (TABLE I-E). However, subsidence of this magnitude could potentially lead to salt cracks in the vicinity of mine shafts, which could in turn lead to subsurface ground water incursion. In addition, abrupt changes in subsidence rates between locations above mined areas and adjacent unmined areas indicate cause for concern regarding any surface facilities which cross over such boundaries.

CONCLUSIONS

The elevation surveys have indicated significant surface subsidence rates at all sites, with maximum values varying from about -0.06 ft/yr at the Bryan Mound site to -0.30 ft/yr at the West Hackberry site. Thirty-year projections of the indicated subsidence rates indicate that surface subsidence could lead to significant surface flooding problems at the West Hackberry site and to a lesser degree at the Bayou Choctaw site. No such flooding problems are foreseen for the other three sites. However, subsidence rates at the Weeks Island mine site of up to -0.19 ft/yr are large enough to arouse concern regarding possible salt fractures in the vicinity of shafts which could in turn lead to water incursion into the mine. Abrupt changes in subsidence rates between locations above mined areas and adjacent unmined areas indicate cause for concern regarding any surface facilities which cross over such boundaries.

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1521	R. D. Krieg
1521	H. S. Morgan
1521	D. J. Segalman
3141	S. A. Landenberger (5)
3154-1	C. Dalin, For: DOE/OSTI (8)
3151	W. I. Klein (3)
6000	D. L. Hartley
6200	V. L. Dugan
6225	H. J. Sutherland
6230	W. C. Luth
6231	H. C. Hardee
6232	W. R. Wawersik
6232	D. H. Zeuch
6250	R. K. Traeger
6257	J. K. Linn (10)
6257	J. L. Todd
6257	K. L. Goin (10)
6257	J. T. Neal (15)
6258	D. S. Preece
6332	L. D. Tyler
8524	P. W. Dean

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SER LEVEL) FROM SUBSIDENCE SURVEYS
A. West Hackberry SPR Site, 6 Surveys From 1/83 to 12/87

Location Of Survey Points And Monuments	Point Name Or Number	North (Y) Coord Feet	East (X) Coord Feet	Survey Point Elevations Dates / Months From Initial Survey					
				1/83	8/83 0	7	2/84 13	3/85 26	9/86 44
TOP OF CONC. SLAB - S/H CNR SUB STATION CONTROL BLDG.	1	19728. b	4495.5	21.72	21.69	21.57	21.34	21.06	20.74
TOP OF CONC. SLRB - N/E CNR SUB STATION CONTROL BLDG.	2	19744.8	4535.3	21.74	21.7	21.58	21.36	21.03	20.73
TOP OF CONC. SLRB - SOUTH DOORWAY WEST SIDE MAINTENANCE BLDG	3	20079 . 1	4410.6	22.58	22.54	22.4	22.16	21.73	21.58
TOP OF CONC. SLRB - NORTH DOORWAY WEST SIDE MAINTENANCE BLDG	4	20222.5	4409.9	22.6	22.54	22.42	22.14	21.8	21.55
TOP OF CONC. SLRB - S/E CNR WASTE TREATMENT PUMP PRD	5	20289.5	4318.2	21.52	21.46	21.32	21.05	20.74	20.5
TOP OF CONC. SLRB - N/H CNR WASTE TREATMENT PUMP PRD	6	20304.8	4310.6	21.56	21.5	21.35	21.08	20.77	20.49
TOP OF CONC. SLAB - WEST DOORWAY NORTH SIDE CONT. ROOM BLDG	7	20470 . 1	4425.1	21.67	21.6	21.47	21.17	20.81	20.57
TOP OF CONC. SLRB - EAST DOORWAY NORH SIDE CONT. ROOM BLDG	8	20470.2	4521.7	21.62	21.58	21.43	21.16	20.84	20.54
TOP OF CONC. - N/U CNR GENERATOR PRD	9	20450.8	4590.1	21.66	21.61	21.46	21.21	20.84	20.62
TOP OF CONC. - S/E CNR GENERATOR PAD	10	20410.1	4606	21.64	21.57	21.44	21.18	20.85	20.59
TOP OF CONC. SLRB - CENTER-LINE NORTH END FIREWATER PUMP PRD	11	20407.9	4885	24.24	24.21	24.08	23.84	23.57	23.34
TOP OF CONC. SLRB - CENTER-LINE SOUTH END FIREWATER PUMP PRD	12	20369.8	4884.8	24.2	24.17	24.04	23.81	23.55	23.27
TOP OF FDN - N/E CNR NoRh RAW WATER PUMPS	13	20349	4874 . 1	24.15	24.13	24	23.77	23.49	23.23
TOP OF FDN - S/U CNR NORh RAW WATER PUMPS	14	20320.8	4823.8	24.17	24.16	24.02	23.79	23.49	23.26
TOP OF FDN - N/E CNR SOUTH RAW WATER PUMPS	15	2029 1	4874.1	24.18	24.1b	24.04	23.81	23.53	23.26
TOP OF FDN - S/U CNR SOuH RRU WATER PUMPS	16	20270.6	4823 . 7	24.15	24.17	23.99	23.76	23.49	23.23
N/H CNR OF NORh BRINE SEPRRROR	17	20242.1	4772.5	31.54	31.52	31.39	31.15	30.88	30.65
S/E CNR OF NORTH BRINE SEPARATOR	18	20 154	4880.2	31.52	31.5	31.36	31.14	30.88	30.6
N/E CNR OF SOuH BRINE SEPRRROR	19	20138.1	4880.1	30.52	30.5	30.37	30.14	29.88	29.62
S/U CNR OF SOuH BRINE SEPRRROR	20	20049.9	4772.5	30.51	30.48	30.36 NO RCCESS	29.88	29.61	
TOP OF FDN - N/E CNR NoRh BRINE PUMPS	21	19996.2	4880	24.13	24.11	23.97	23.74	23.5	23.23
TOP OF FDN - S/H CNR NoRh BRINE PUMPS	22	199b1.8	4823 . 6	24.06	24.04	23.9	23.66	23.41	23.14
TOP OF FDN - N/E CNR SOUTH BRINE PUMPS	23	19926.2	4880	24.1	24.08	23.95	23.72	23.47	23.21
TOP OF FDN - S/H CNR SOUTH BRINE PUMPS	24	19891.8	4823.6	24.08	24.06	23.92	23.69	23.45	23.15
TOP OF CONC. - S/E CNR OF BRINE POND	25	19770.2	5480 . 1	24.59	24.58	24.46	24.24	23.99	23.71
TOP OF CONC. - N/H CNR OF BRINE POND	26	20127.9	4920.1	24.66	24.68	DESTROYED	-	23.98	23.77
TOP OF CONC. - N/E CNR RAW WATER POND	27	20488.8	5480.3	24.29	24.23	24.11	23.87	23.56	23.26
TOP OF FDN - S/E CNR HWP 123	29	21183.4	4551.8	18.73	18.69	18.54	18.28	17.88	17.61
TOP OF FDN - N/E CNR HWP 128	31	21039	4550.9	19.08	19.04	18.89	18.62	18.24	17.94
TOP OF FDN - S/E CNR UHP 22	33	20823.8	4552.9	18.19	18.13	17.98	17.71	17.36	17.07
TOP OF FDN - S/U CNR UHP 131	3s	20823.4	4508.9	19.04	18.98	18.84	18.56	18.2	17.91
TOP OF FDN - N/H CNR UHP 117	37	21038.9	4508.2	18.7	18.67	18.51	18.25	17.84	17.57
TOP Of FDN - N/U CNR UHP 122	39	21188.8	4508.2	18.68	18.64	18.49	18.23	17.84	17.57
TOP OF LOUER FLANGE - SOUTH SIDE	UELL 6	22433.8	4959.3	6	5.95	5.83	5.63	5.23	5.05
TOP OF LOUER FLANGE - NoRh SIDE	UELL 6A	22298.3	4959	8.69	8.66	8.53	8.34	7.93	7.7
TOP OF LOUER FLRNge - S/u SIDE	UELL 6B	22343	5108.6	6.16	6.14	6.01	5.83	5.47	5.26
TOP OF LOUER FLANGE - S/E SIDE	UELL 6C	22343 . 1	4805.5	6.28	6.24	6.11	5.9	5.48	5.26
TOP OF LOUER FLRNge	UELL 7	22031.2	6083.9	---	5.88	5.78	5.64	5.39	5.17
TOP OF LOUER FLRNge	UELL 7R	22104	6084.2	---	5.08	4.94	4.87	4.47	4.29
TOP OF LOUER FLRNge	UELL 7B	22019.4	6134	---	5.04	4.9	4.89	4.52	4.33
TOP OF CENTER FLRNge - NORh SIDE	UELL 8	21308	5282.3	14.42	14.41	14.29	14.09	13.79	13.78**
TOP OF LOUER FLRNge - NORTH SIDE	UELL 8A	21324.3	5329.3	14.04	14.03	13.9	13.71	13.35	13.12
TOP OF LOUER FLRNge - NORh SIDE	UELL 8B	21341.7	5376.9	14.05	14.07	13.93	13.74	13.41	13.28
TOP OF CENTER FLANGE - S/u SIDE	UELL 9	2 1727	4819.5	14.7	14.66	14.52	14.29	13.87	13.24**
TOP OF LOUER FLANGE	UELL 9A	21583.4	4761.1	---	12.45	12.29	12.08	11.64	12.17**
TOP OF LOUER FLANGE	UELL 9B	21716.1	4695.3	---	11.85	11.68	11.48	11.03	11.43**

XX Elevation Measurements Not Used In Data Analysis

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SEA LEVEL) FROM SUBSIDENCE SURVEYS

A. West Hackberry SPR Site, 6 Surveys From 1/83 to 12/87

Location Of Survey Points And Monuments	Point Name Or Number	North (Y) East (X)		11'83 0	Survey Point Elevations Dates / Months From Initial Survey					
		Coord Feet	Coord Feet		8/83 7	2/84 13	3/85 26	9/86 44	12/87 59	
TOP OF LOUER FLANGE - WEST SIDE	UELL 11	18925 . 1	5109.3	10.89	10.88	10.8	10.62	10.43	10.3	
TOP OF LOUER FLANGE - WEST SIDE	UELL 11A	18974.5	5107.8	12.16	12.16	12.08	11.89	11.7	11.59	
TOP OF CENTER FLRNGE - WEST SIDE	UELL 11B	18876.8	5111.6	13.16	13.16	13.09	12.91	12.72	12.6	
TOP OF LOWER FLANGE - WEST SIDE	UELL 101	20291.5	3965.7	19.75	19.68	19.51	19.26	18.89	18.69	
TOP OF LOWER FLRNGE - EAST SIDE	UELL 102	20640 . 5	3343.5	17.06	---	16.78	16.47	16.09	15.83	
TOP OF LOWER FLRNGE - WEST SIDE	WELL 103	21015.3	3959	17.12	17.04	16.89	16.58	16.07	16	
TOP OF LOWER FLRNGE - EAST SIDE	UELL 104	19890 . 7	3335 . 1	18.74	---	18.48	18.27	17.94	17.7	
TOP O F LOWER FLANGE - WEST SIDE	UELL 105	19515.4	3957.9	18.67	18.66	18.49	18.27	17.97	17.74	
TOP O F LOWER FLANGE - WEST SIDE	UELL 106	19139.5	3258 . 7	---	17.17	17.05	16.77	16.55	16.34	
TOP OF LOWER FLANGE - EAST SIDE	UELL 107	21390.2	3349.6	15.84	15.73	15.5	15.15	14.75	14.47	
TOP OF LOWER FLANGE - NORTH SIDE	UELL 108	18186	4764.3	8.02	8.01	7.92	7.76	7.64	7.49	
TOP OF LOWER FLANGE - WEST SIDE	UELL 109	21764.5	3960 . 3	10.61	10.48	10.27	9.98	9.66	9.33	
TOP OF LOWER FLANGE - WEST SIDE	UELL 110	22514.5	3957.6	7.98	7.91	7.69	7.38	7.04	6.74	
TOP OF LOWER FLRNGE - SOUTH SIDE	UELL 111	22870 . 1	3308.9	8.08	a.04	7.85	RIG	7.2	6.87	
TOP OF LOWER FLANGE	UELL 112	18185.7	5514.1	---	8.48	8.31	8.14	8.04	7.92	
TOP OF LOWER FLRNGE - SOUTH SIDE	UELL 113	22501.6	2659.8	7.45	7.43	x7.17	6.81	6.44	6.21	
TOP OF LOWER FLANGE - NORTH SIDE	UELL 114	21764.6	2659.6	7.37	7.34	7.06	6.71	6.36	6.12	
TOP OF LOWER FLRNGE - NORTH SIDE	UELL 115	22139.3	3307 . 4	9.15	9.07	8.87	8.43	8.03	7.72	
TOP OF LOWER FLRNGE - NORTH SIDE	UELL 116	21828.5	1911.2	---	8.01	7.83	7.49	7.18	6.93	
CONC MONUMENT SET BY OTHERS	BM 1	18640 . 6	4900	10.61	10.6	10.53	10.35	10.16	9.96	
CONC MONUMENT SET BY OTHERS	BM 3	20599 . 9	4899.9	18.14	19.11	17.98	17.74	DESTROYED	---	
CONC MONUMENT SET BY OTHERS	BM 4	20600	4400	18.83	18.76	18.62	18.35	18.04	17.77	
CONC MONUMENT SET BY OTHERS	BM 5	21300.1	4900 . 4	16.16	16.11	15.97	15.75	15.38	15.15	
CONC MONUMENT SET BY OTHERS	BM 7R	22099.6	4900 . 3	7.79	GONE	7.62	DESTROYED	---	---	
CONC MONUMENT SET BY OTHERS	BM 8	19308.1	4435.1	17.48	17.45	17.34	17.12	16.87	16.63	
CONC MONUMENT SET BY OTHERS	BM 9	19798.3	4395	20.49	GONE	20.31	DESTROYED	---	---	
CONC MONUMENT SET BY OTHERS	BM 11	18977.7	4583 . 9	12.4	12.39	12.3	12.09	11.87	11.7	
CONC MONUMENT SET BY OTHERS	BM 12	18977.9	3578.6	16.31	16.29	16.19	15.96	15.73	15.53	
CONC MONUMENT SET BY OTHERS	BM 13	19758	3579 . 1	23.5	23.45	23.33	23.19	22.87	22.63	
CONC MONUMENT SET BY OTHERS	BM 14	20398.6	3579 . 1	19.05	18.98	18.85	18.55	18.2	17.94	
CONC MONUMENT SET BY OTHERS	BM 15	21300	3579 . 1	17.49	17.39	17.25	16.89	16.5	16.26	
SUBSIDENCE MONUMENT SET BY PLT	SMS 1	18209.9	5035.3	10.11	10.11	10.04	9.88	9.73	9.6	
SUBSIDENCE MONUMENT SET BY PLT	sns 2	19731.1	4955 . 9	19.08	19.05	18.93	18.7	18.46	18.15	
SUBSIDENCE MONUMENT SET BY PLT	sns 3	21695.5	6338	3.51	3.54	3.45	---	3.12	2.94	
SUBSIDENCE MONUMENT SET BY PLT	sns 4	21829.9	4875.7	8.03	8.01	7.88	7.67	7.23	7.03	
SUBSIDENCE MONUMENT SET BY PLT	sns 5	22103.2	1727	6.65	6.63	6.47	6.16	5.87	5.59	
SUBSIDENCE MONUMENT SET BY PLT	SMS 6	20968.9	3521.9	17.08	16.99	16.85	16.54	16.15	15.92	
SUBSIDENCE MONUMENT SET BY PLT	SMS 7	19379.4	3371.5	21.33	21.28	21.17	20.91	20.66	20.43	
TOP WEST EDGE 4" PVC WITH CAP REMOVED	P 8**	---	---	18.31	18.18	17.98	17.6	17.31		
TOP WEST EDGE 4" PVC WITH CAP REMOVED	P 9**	---	---	18.22	18.08	17.83	17.42	17.11		
TOP WEST EDGE 4" PVC WITH CRP REMOVED	PB 1**	---	---	16.69	16.56	16.37	DESTROYED	15.87		
TOP WEST EDGE 4" PVC WITH CRP REMOVED	P 11**	---	---	13.78	13.71	13.54	13.3	13.11		

** Elevation Measurements Not Used In Data Analysis

TABLE I

SUMMARY OF ELEVATIONS (FEET ABOVE SEA LEVEL) FROM SUBSIDENCE SURVEYS

B. Bryan Mound SPR Site, 6 Surveys From 12/82 to 9/87

Location Of Survey Points Rnd Monuments	Point Name Or Number	North (Y) Coot-d Feet	East (X) Coot-d Feet	Survey Point Elevations Dates / Months From Initial Survey						
				12/82 0	8/83 8	1/84 13	3/85 27	11/86 47	9/87 57	
TOP OF CONC. SLAB - N/W CRNR SECURITY BLDG.	6A	51232.3	200524.7	19.64	19.64	19.63	19.11	19	19	
TOP OF CONC. SLRB - S/U CRNR SECURITY BLDG. * S/E CRNR	6C	51236.6	200498.9	19.63	19.50*	19.61	19.12	19	19	
rop OF FDN - SOUTH SIDE BMT 1	7A	51742.9	201279.6	11.4	11.39	11.36	10.87	10.78	10.8	
TOP OF FDN - WEST SIDE BMT 1	7B	51861.5	201152.9	11.44	11.45	11.41	10.91	10.82	10.84	
TOP OF FDN - EAST SIDE BMT 1	7c	51833.9	201374.7	11.4	11.41	11.37	10.87	10.78	10.79	
rop OF FDN - NORTH SIDE BMT 1	7D	51962.6	201290.8	11.37	11.4	11.34	10.85	10.82	10.8	
rop OF FDN - SOUTH SIDE Btr 2	BR	51743	200835.2	11.45	11.47	11.44	10.94	10.83	10.86	
TOP OF FDN - WEST SIDE BMT 2	8B	51859.8	200708-a	11.36	11.35	11.32	10.82	10.84	10.84	
rop OF FDN - EAST SIDE BMT 2	8C	51831.8	200930.4	11.47	11.48	11.44	10.95	10.84	10.85	
rop OF FDN - NORTH SIDE BMT 2	BD	51965	200834.2	11.45	11.48	11.45	10.96	10.85	10.86	
TOP OF FDN - SOUTH SIDE BMT 3	9A	51742.8	200389.9	9.45	9.46	9.44	8.92	8.82	8.87	
rop OF FDN - WEST SIDE BMT 3	9B	51859.7	200264.6	9.36	9.34	9.31	8.81	8.8	8.85	
TOP OF FDN - EAST SIDE BMT 3	9C	51842.7	200487.8	9.48	9.47	9.45	a.94	8.84	8.87	
rop OF FDN - NORTH SIDE BMT 3	9D	51965.2	200384.3	9.46	9.48	9.46	8.96	8.84	8.89	
TOP OF FDN - SOUTH SIDE BMT 4	10A	51743	199947.3	9.3	9.29	9.26	8.78	8.69	8.72	
TOP OF FDN - WEST SIDE BMT 4	10B	51859.6	199821.1	9.21	9.21	9.18	8.78	8.69	a.75	
rop OF FDN - EAST SIDE BMT 4	10C	51842.6	200044.2	9.36	9.33	9.3	8.81	8.71	8.76	
TOP OF FDN - NORTH SIDE BMT 4	10D	51965.8	199939.5	9.24	9.26	9.22	8.73	8.62	8.64	
TOP OF CONC. - INSIDE S/E CNR OF BRINE POND	11A	52237.5	201083.2	24.27	24.2	24.28	23.77	23.72	23.72	
TOP OF CONC. - INSIDE S/U CNR OF BRINE POND	11B	52238.7	200724.1	24.54	24.48	24.55	24.06	24.02	24.01	
TOP OF CONC. - INSIDE CNR N/U CNR OF BRINE POND	11C	52500.9	200723	24.06	23.99	24.07	23.57	23.5	23.52	
TOP OF CONC. - INSIDE CNR N/E CNR OF BRINE POND	11D	52499.8	201088.1	24.23	24.15	24.23	23.72	23.66	23.65	
TOP OF CONC. SLAB-NORTH DOORRY ON EAST SIDE CONTROL RM BLDG	12B	52541	201932.5	10.48	10.52	10.49	9.95	9.85	---	
TOP OF CONC. SLRB-SOUTH DOORRY ON EAST SIDE CONTROL RM BLDG	12c	52638.5	201932.4	10.46	10.56	10.47	9.82	9.87		
TOP OF CONC. SLAB - S/E CNR RECEIVING SHOP BUILDING	13A	52126.5	202078.7	10.05	10.07	10.06	9.54	9.45	9.44	
TOP OF CONC. SLRB - N/U CNR RECEIVING SHOP BUILDING	13B	52227	202013.8	10.11	10.07	10.06	9.55	9.46	9.4s	
TOP OF UPPER FLRNGE - SOUTH SIDE	WELL 1	51782.1	202595.3	13.41	13.47	13.42	12.92	12.84	12.81	
TOP OF UPPER FLANGE - SOUTH SIDE	UELL 1A	51779.5	202489.3	12.23	12.31	12.25	11.75	11.63	11.64	
rop OF UPPER FLRNGE - NORTH SIDE	UELL 2	50834.4	201746.6	17.48	17.5	17.45	16.95	16.92	16.85	
TOP OF UPPER FLRNGE - EAST SIDE	WELL 2A	50830.4	201677.9	17.21	17.25	17.19	16.88	16.77	16.86	
	UELL 4**	51783.2	201720.1	---	11.07	---	14.28	14.14	14.14	
TOP OF LOWER FLRNGE - WEST SIDE	UELL 4A	51772.3	201609.9	13.13	13.14	13.1	12.89	12.81	12.83	
TOP OF LOWER FLRNGE - WEST SIDE	UELL 4B	51849.3	201677.4	14.48	14.47	14.41	13.92	13.8	13.8	
TOP OF LOWER FLRNGE - WEST SIDE	UELL 4C	51720.1	201677.7	14.44	14.44	14.4	13.9	13.79	13.81	
TOP OF UPPER FLANGE - NORTH SIDE	UEL 5	52819.9	201247	8.03	8.09	8.05	7.55	7.46	7.46	
TOP OF UPPER FLANGE - NORTH SIDE	WELL 5A	52760.1	201295	G	8.06	8.01	7.51	7.42	7.44	
TOP OF UPPER FLRNGE - SOUTH SIDE	WELL 5C	53033.6	201166.4	6.01	6.09	6.08	5.6	5.53	5.54	
TOP OF UPPER FLRNGE - SOUTH SIDE	UELL 101A	53228.2	202101.3	7.05	7	6.96	6.48	6.36	6.43	
TOP OF UPPER FLRNGE - SOUTH SIDE	UELL 101C	53190	202165.8	7.1	7.05	7	6.53	6.4	6.44	
TOP OF UPPER FLANGE - NORTH SIDE	UEL 1028	53494.3	203008.4	5.66	5.7	5.62	5.14	5.06	5.09	
TOP OF UPPER FLRNGE - NORTH SIDE	UEL 102C	53569.8	203009.3	6.62	6.67	6.59	6.11	6.06	6.09	
TOP OF UPPER FLANGE - WEST SIDE	UEL 111B	54008.1	203757.8	7.15	7.11	7.05	6.59	6.58	6.59	
	UEL 111C	54009.5	203680	---	10	9.9	9.42	9.43	---	
TOP OF UPPER FLANGE - EAST SIDE	UEL 103B	53280.6	203691.1	6.42	6.48	6.42	5.96	5.89	5.92	
TOP OF UPPER FLRNGE - WEST SIDE	WELL 103C	53280.3	203766.2	7.01	7.06	6.97	6.52	6.44	6.48	
TOP OF UPPER FLANGE - NORTH SIDE	UEL 104R	52689.1	202643.9	10.83	10.83	10.78	10.25	10.17	10.18	
rop OF UPPER FLRNGE - NORTH SIDE	UEL 104B	52737.7	202701.7	10.76	10.74	10.69	10.17	---	10.12	
rop OF UPPER FLRNGE - NORTH SIDE	UEL 104C	52665	202713.8	10.86	10.86	10.82	10.29	10.22	10.22	

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TABLE I
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B. Bryan Hound SPR Site, 6 Surveys From 12/82 to 9/87

Location Of Survey Points Rnd Monuments	Point Name Or Number	North (Y) Coord Feet	East (X) Coord Feet	Survey Point Elevations Dates / Months From Initial Survey					
				12/82	8/83	1/84	3/85	11/86	9/87
				0	8	13	27	47	57
TOP OF UPPER FLRNGE - WEST SIDE	UELL 105B	52315.2	203338.2	14.09	14.15	14.09	13.62	13.53	13.5
TOP OF UPPER FLRNGE - WEST SIDE	UELL 105C	52302.4	203264	13.32	13.4	13.32	12.83	12.75	12.71
TOP OF UPPER FLRNGE - WEST SIDE	UELL 106R	50889.2	203784.5	16.43	16.4	16.34	15.83	15.73	15.76
rop OF UPPER FLANGE - EAST SIDE	UELL 106B	50954.6	203747.3	16.58	16.64	16.56	16	15.85	---
rop OF UPPER FLANGE - WEST SIDE	UELL 106C	50955.1	203821.4	17.3	17.31	17.24	16.72	16.49	16.53
rop OF UPPER FLANGE - EAST SIDE	UELL 107A	51363.3	203111.5	15.81	15.83	15.76	---	15.13	15.16
rop OF UPPER FLANGE - EAST SIDE	UELL 107B	51298.4	203148.8	15.94	15.94	15.9	15.38	15.26	15.31
rop OF UPPER FLANGE - EAST SIDE	UELL 107C	51298.4	203073.8	16.16	15.96**	16.11	15.59	15.46	15.51
TOP OF UPPER FLRNGE - WEST SIDE	UELL 108A	51698.4	203764.8	16.5	16.56	16.5	15.98	15.88	15.85
TOP OF UPPER FLRNGE - WEST SIDE	UELL 108B	51762.6	203727.5	16.58	16.64	16.56	16.05	15.98	15.96
rop OF UPPER FLANGE - WEST SIDE	UELL 108C	51761.2	203801.4	16.59	16.59	16.54	15.81**	15.94	15.9
rop OF UPPER FLANGE - NORTH SIDE	UELL 109A	50599.5	203035.6	16.34	16.38	16.35	15.91	15.7	15.69
rop OF UPPER FLANGE - NORTH SIDE	UELL 109B	50534.5	202998.2	16.45	16.49	16.46	15.91	15.81	15.84
rop OF UPPER FLANGE - NORTH SIDE	UELL 109C	50600.4	202960.7	16.41	16.46	16.42	15.88	15.79	15.81
rop OF UPPER FLANGE - NORTH SIDE	UELL 110A	51030.3	202496.3	16.49	16.53	16.47	15.94	15.86	15.87
rop OF UPPER FLANGE - NORTH SIDE	UELL 110B	50992.4	202430-a	16.41	16.35	16.29	15.77	15.69	15.7
rop OF UPPER FLANGE - N om SIDE	UELL 110C	51067.8	202430.4	16.32	16.35	16.3	15.77	15.68	15.7
TOP OF UPPER FLRNGE - SOUTH SIDE	UELL 112R	50328	202330.1	12.04	12.2**	12	11.51	11.36	11.32
TOP OF UPPER FLRNBE - NORTH SIDE	UELL 112C	50253.8	202318.6	12.02	12.07**	11.88	11.39	11.26**	11.44
SUBSIDENCE HONUHEN	sns 1	51715.5	199794.1	9.07	9.07	9.05	8.55	---	8.5
SUBS1 DENCE MONUMENT	SMS 2	51479.7	200042	7.7	7.69	7.68	---	---	---
SUBSIDENCE MONUMENT	sns 3**	50652.4	200779.9	11.94	11.99	DESTROYED	---	---	---
SUBSIDENCE HONUHEN	SMS 4	50652.9	201192.4	12.5	12.55	12.5	---	---	---
SUBSIDENCE MONUMENT	SMS 5	50677.6	201604.9	16.35	16.38	16.33	15.82	---	15.72
SUBSIDENCE HONUHEN	sns 6	51179	201604.5	17.01	17.05	17	16.49	---	16.37
SUBS1 DENCE MONUMENT	SMS 7**	51178.2	201869.2	15.95	DESTROYED	---	---	---	---
SUBS1 DENCE MONUMENT	SMS 9	51660.3	202078.8	12.11	12.14	12.09	11.59	---	11.47
SUBS1 DENCE HONUHEN	SMS 10	51689.7	202589.5	12.47	12.53	12.48	11.79**	---	11.86
SUBSIDENCE HONUHEN (CAP DESTROYED)	sns 11**	51899.3	202589.5	9.33	DESTROYED	9.26	---	---	8.69
SUBSIDENCE MONUMENT	sns 12	51859.9	202278	9.67	9.7	9.66	9.15	---	9.04
SUBS1 DENCE MONUMENT	SMS 13	51781.6	201849.1	11.62	11.65	11.62	11.11	11	11
SUBS1 DENCE HONUHEN	SMS 14	51693.9	201587.2	12.67	12.68	12.65	12.14	---	11.99
SUBSIDENCE MONUMENT	SMS 15	51711.7	201490.2	11.78	11.77	11.75	---	---	---
SUBSIDENCE MONUMENT (CAP DESTROYED)	SHS 16	52221.1	201705.5	11.06	11.13	11.06	---	---	---
SUBSIDENCE MONUMENT (CAP DESTROYED)	sns 17	52745.2	201499.9	5.92	5.99	5.96	---	---	---
SUBSIDENCE HONUHEN	SMS 18	53100.2	201250	6.44	6.51	6.45	5.94	5.86	5.88
SUBS1 DENCE MONUMENT	SMS 19	52659.5	201000.2	7.03	7.09	7.04	6.51	6.44	6.46
SUBS1 DENCE MONUMENT	SMS 20	52577.5	201249.8	9.32	9.41	9.35	8.83	8.75	8.76
SUBSIDENCE MONUMENT	sns 21	51984.4	201249.8	10.85	10.85	10.83	---	---	---
SUBSIDENCE HONUHEN	sns 22	51982.8	200998.8	a. 16	a. 16	8.14	6.73**	---	---
SUBS1 DENCE HONUHEN	SMS 24	51499.9	200559.3	15.53	15.53	15.51	14.99	14.88	14.89
SUBSIDENCE HONUHEN	SMS 25	51983.4	200559.8	9.37	9.38	9.35	8.86	8.75	8.78
SUBSIDENCE HONUHEN SET BY PLT-**DISTURBED BY PIPELINE CONST.	SHS 27**	50389.5	202666.8	14.23	14.27	14.06*	---	13.4	13.45
SUBSIDENCE HONUHEN SET BY PLT	SHS 28	51327.7	203717.1	8.36	8.42	8.37	7.84	7.73	7.75
SUBSIDENCE HONUHEN SET BY PLT	SMS 29	52029.8	203131.5	10.92	10.98	10.94	10.43	10.33	10.3
SUBSIDENCE MONUMENT SET BY PLT	sns 30	53564.8	203486.1	1.86	1.92	1.86	1.36	1.33	1.35
SUBSIDENCE MONUMENT SET BY PLT	SMS 31	52851.2	202413.6	6.84	6.88	6.83	6.32	6.24	6.23

xx Elevation Measurements Not Used In Data Analysis

TABLE I
SUMMARY OF ELEVATIONS <FEET RBOUE SEA LEVEL> FROH SUBSIDENCE SURVEYS
C. Bayou Choctaw SPR Site, 6 Surveys From 12/82 to 1/88

Location Of Survey Points And Monuments	Point Name Or- Number	North (Y) East (X)		Survey Point Elevations Dates / Months From Initial Survey					
		Coord Feet	Coord Feet	12/82 0	11/83 11	1/84 13	2/85 26	9/86 4s	1/88 61
TOP OF CONC. FDN - N/W CORNER OF INTAKE STRUCTURE	1R	600783.5	2007070.8	10.28	10.26	10.25	10.17	10.33	9.84**
TOP OF CONC. FDN - S/E CORNER OF INTAKE STRUCTURE	1B	600735.2	2007110.5	10.33	10.3	10.3	10.22	10.39	10.31
TOP OF CONC. SLRB - N/U CORNER OF HELIPORT	2R	600606.4	2007131	8.51	8.48	8.46	8.39	8.53	8.47
TOP OF CONC. SLRB - S/E CORNER OF HELIPORT	2B	600578.2	2007161.8	8.62	8.59	8.58	8.52	8.66	8.59
rop OF CONC. SLRB - S/E CORNER OF WATER UELL	3	600535.2	2007127.2	9	8.95	8.95	8.87	9.01	8.94
rop OF CONC. FDN - N/W CORNER OF HINI LEACHING PUMPS	4R	600044.1	2007060.1	8.28	8.24	8.24	8.15	8.29	8.26
TOP OF CONC. FDN - N/E CORNER OF HINI LERCHING PUHPS	4B	600044	2007093	7.97	7.94	7.93	7.85	7.98	7.94
TOP OF CONC. FDN - S/E CORNER OF HINI LEACHING PUHPS	4c	600014.2	2007093.1	8.03	7.98	7.97	7.89	8.02	8.02
TOP OF CONC. FDN - S/W CORNER OF HINI LEACHING PUHPS	4D	600014.4	2007060.6	8.34	8.29	8.28	8.2	8.34	8.17
"X" PRINTED ON N/U CORNER OF BRIDGE	5	599925.3	2006927.1	11.1s	11.1	11.1	11.04	11.18	11.09
TOP OF CONC. FDN - N/U CORNER OF SECURITY BUILDING	6R	599897.4	2007228.2	10.78	10.71	10.7	10.63	10.77	10.43**
TOP OF CONC. FDN - CENTERLINE WEST END OF FILTER PUMPS	7R	599977.4	2007118	8.89	8.82	8.82	8.83	8.88	
TOP OF CONC. FDN - CENTERLINE ERST END OF FILTER PUHPS	7B	599977.9	2007752.7	8.86	8.79	8.79	8.82	8.86	
TOP OF CONC. FDN - S/E CORNER OF FILTER TANKS	8R	599995.4	2007743.1	8.82	8.76	8.77	8.76	8.83	
TOP OF CONC. FDN - N/E CORNER OF FILTER TANKS	8B	600032.9	2007743	8.78	8.73	8.73	8.72	8.79	
rop OF MANHOLE RING - EAST EDGE OF WELL PAD 15	9	600024.4	2008097.6	11.12	11.06	11.06	11.04	11.13	11.05
TOP OF CONC. - S/U CORNER OF BRINE RESERVOIR	10R	599441.9	2007727.4	14.72	14.62	14.62	14.49	14.63	14.76**
TOP OF CONC. - N/U CORNER OF BRINE RESERVOIR	10B	599728.8	2007731.2	14.64	14.55	14.55	14.41	14.55	14.42
TOP OF CONC. - N/E CORNER OF BRINE RESERVOIR	10C	599728.8	2008151.2	14.58	14.46	14.46	14.36	14.47	14.5**
rop OF CONC. - S/E CORNER OF BRINE RESERVOIR	10D	599441.2	2008147.3	14.91	14.78	14.78	14.68	14.77	14.73
TOP OF FLHNGE - S/U CORNER OF HRINTENRNE BUILDING	11R	599803.8	2008080	9.06	9.01	9.01	9	9.03	8.95
TOP OF FLANGE N/U CORNER OF MAINTENANCE BUILDING	11B	599854.6	2008079.9	9.1	8.98	8.98	8.97	9.01	8.94
TOP OF FLANGE - N/E CORNER oF MAINTENANCE BUILDING	11C	599854.8	2008240.7	9.13	9.06	9.06	9.01	9.09	9.08
TOP OF FLANGE - S/E CORNER OF MAINTENANCE BUILDING	11D	599804.1	2008240.5	8.98	8.9	8.89	8.84	8.91	8.89
rop OF FLRNGE - S/W CORNER OF CONTROL ROOH BUILDING	12R	599710.2	2008409.3	9.1	9.03	9.03	8.96	9.01	8.94
TOP OF FLRNGE - N/U CORNER OF CONTRUL ROOH BUILDING	12B	599869.9	2008409.6	9.03	8.97	8.97	8.9	8.99	8.91
TOP OF FLRNGE - N/E CORNER OF CONTROL ROOH BUILDING	12C	599870	2008480.7	8.95	8.87	8.87	8.84	8.89	8.77
TOP OF FLRNGE - S/E CORNER OF CONTROL ROOH BUILDING	12D	599709.2	2008480.3	9.08	9.01	9.01	8.95	9.05	8.88
TOP OF CONC. FDN. - CENTERLINE SOUTH EDGE OF BRINE TRNKS	13R	599495	2008235.8	9.39	9.3	9.29	9.19	9.24	9.13
TOP OF CONC. FDN. - CENTERLINE NORTH EDGE OF BRINE TANKS	13B	599563.2	2008232.6	9.21	9.09	9.09	8.97	9.14	9.07
TOP OF CONC. SLRB - CENTERLINE WEST EDGE OF SUHP PUMP	14R	599625.4	2008305.9	8.96	8.9	8.9	8.83	8.9	8.8
TOP OF CONC. SLRB - CENTERLINE WEST EDGE OF SUHP PUHP	14B	599644.8	2008306.9	9.4	9.33	9.33	9.25	9.3s	9.23
TOP OF CONC. FDN. - CENTERLINE EAST EDGE OF PUHP BRSE	15B	599814.5	2008765.4	10.72	10.64	10.64	10.61	10.62	
TOP OF CONC. FDN. - CENTERLINE ERST EDGE OF PUHP BRSE	18B	599733.6	2008765.5	10.7	10.62	10.62	10.54	10.6	
TOP OF CONC. FDN. - CENTERLINE EAST EDGE OF PUMP BASE	21B	599643.9	2008765.5	10.87	10.78	10.78	10.71	10.78	
TOP OF CONC. FDN. - S/U CORNER OF PUMP BRSE	22B	599820	2008726.1	10.77	10.69	10.68	10.65	10.65	
TOP OF CONC. FDN. - CENTERLINE WEST EDGE OF PUHP BASE	25B	599733.9	2008724	10.69	10.61	10.61	10.57	10.59	
TOP OF CONC. FDN. - CENTERLINE WEST EDGE OF PUHP BASE	28B	599643.9	2008724.1	10.84	10.73	10.73	10.69	10.74	
rop OF MONUMENT AT N/W CRNR OF STORAGE BLDG NERR WELL BC 8H	29**			---	---	10.4	10.32	10.38	10.38
TOP OF MANHOLE RING - WEST EDGE OF UELL PRD 20	30	598523.8	2006350.8	9.45	9.36	9.35	9.18	9.32	9.31**
TOP OF CONC. - N/E CORNER OF UELL PRD 19	31R	598209.9	2007459.6	12.26	12.13	12.12	11.98	11.93	11.81
rop OF CONC. - S/E CORNER OF UELL PAD 19	31B	597967.7	2007505.6	12.95	12.87	12.85	12.69	12.76	12.61
BRRSS DISC IN CONCRETE. - N/E CORNER OF UELL PRD 19	32	598190.4	2007462.7	12.3	12.19	12.18	12.01	12.13	12
LOWER CRSING - S/E EDGE	UELL acl	599428.1	2006853.5	9.16	9.1	9.09	8.97	9.15	9.18xX
UPPER FLANGE - NORTH EDGE	UELL BC2	599814.8	2007060	10.36	10.32	10.3	10.23	10.38	10.36
UPPER FLANGE - NORTH EDGE	UELL BC3	600489.9	2007107.9	10.56	10.54	10.52	10.52	10.67	10.89**

** Elevation Measurements Not Used In Data Analysis

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SER LEVEL) FROM SUBSIDENCE SURVEYS
C. Bayou Choctaw SPR Site, 6 Surveys From 12/82 to 1/88

Location Of Survey Points And Monuments	Point Name Or Number	North (Y) East (X)		Survey Point Elevations Dates / Months From Initial Survey					
		Coord Feet	Coord Feet	12/82 0	11/83 11	1/84 13	2/85 26	9/86 45	1/88 61
LOUER CRSING - NORTH SIDE	UELL BC4	599457	2007672.6	12.53	12.47	12.46	12.36	12.51	---
LOUER CASING - SOURH SIDE (casing cut and rough)	UELL BC8A	598867	2007048.6	9.49	9.43	9.42	9.51	9.55	9.62
LOUER CASING - SOURH EDGE <casing cut off - tree removed>	UELL BC11	599984.2	2006407.5	9.19	9.17	9.16	7.74**	7.83**	---
UPPER FLRNGE - N/E EDGE	UELL BC13	600406.6	2006617.5	8.67	8.62	8.61	8.56	8.62	8.62
TOP OF LOUER FLRNGE - SOURH SIDE	UELL BC15	600109.2	2007960.7	---	12.97	12.97	12.93	13.05	13.01
TOP OF FLRNGE - NORRH SIDE - 2nd BELOW GROUND LEUEL	UELL BC15A	600056	2007933.3	---	7.65	7.64	7.59	7.72	7.68
UELDED "L" FLANGE - WEST SIDE (workover in progress)	UELL BC18	599483.7	2008478.1	13.81	13.77	13.77	DESROYED	---	---
UELDED "L" FLRNGE - SOURH SIDE (not recovered)	UELL BC18A	599558.1	2008484.2	14.21	14.17	14.17	DESROYED	---	---
TOP UPPER FLANGE - EAST SIDE	UELL BC19	598035.1	2007422.5	10.8	10.76	10.94**	10.84**	9.68**	9.64**
TOP UPPER FLRNGE - N/E SIDE	UELL BC19A	598078.7	2007392.5	8.36	8.3	8.26	8.17	8.28	8.29**
UELDED "L" FLRNGE - NORRH SIDE	UELL BC20	598636.8	2006418.3	10.26	10.17	10.15	10.07	10.2	10.15
UELDED "L" FLANGE - EAST SIDE <clip gone - broken>	UELL BC20A	598564.9	2006434.5	11.02	10.93	10.92	11.23~	10.06**	10.05**
TOP OF UPPER FLNGE-LOUER CRSING-NORTH SIDE (point by LANIER)	WELL BC102	599709.1	2006700.3	---	10.82	10.81	11.09**	11.23**	11.24**
UPPER FLRNGE - SOURH EDGE	UELL CH 1	600662.2	2007124.2	9.42	9.39	9.39	9.32	9.48	9.43
LOUER CRSING - NORRH EDGE	UELL CH 10	599384.3	2006174.8	9.35	9.29	9.27	9.22	9.31	9.37**
TOP OF CONC-S/E END OF CNTRL BLDG @ CL OF DOORWAY (weld shut 33**)				---	---	9.17	9.14	9.18	9.08
TOP OF TILE FLOOR @ CL OF MAIN ENTRANCE TO CONTROL BUILDING	34**			---	---	9.15	9.11	9.18	9.1
SUBSIDENCE MONUMENT	sns 1	600569.3	2007039.8	5.33	5.29	5.3	5.22	5.36	5.34
SUBSIDENCE MONUMENT <destroyed>	sns 2	600178.4	2006423.9	3.57	DESROYED	---	---	---	---
SUBSIDENCE MONUMENT	sns 3	599550.5	2008703.2	5.31	5.26	5.25	5.27	DESROYED	---
SUBSIDENCE MONUMENT	stls 4	599529.26	2007626.7	7.03	6.97	6.96	6.86	6.99	---
SUBSIDENCE MONUMENT	sns 5	599251.2	2007150.4	5.16	5.1	5.1	5.01	---	4.98
SUBSIDENCE MONUMENT	SMs 6	598204.4	2007368	5.17	5.09	5.08	4.96	4.85	4.79

XX Elevation Measurements Not Used In Data Analysis

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SEA LEVEL) FROM SUBSIDENCE SURVEYS
D. Sulphur Hines SPR Site, 6 Surveys From 1/83 to 9/87

Location Of Survey Points And Monuments	Point Name Or Number	North (Y) Coord Feet	East (X) Coord Feet	Survey Point Elevations Dates / Months From Initial Survey					
				1/83 0	8/83 7	2/84 13	3/85 26	9/86 44	9/87 56
TOP OF CONC. FDN - NORTH SIDE OF FIRE WATER TANK	1A	579988	1344218.8	18.98	18.89	18.92	18.87	18.28	18.78
TOP OF CONC. FDN - EAST SIDE OF FIRE WATER TANK	18	579954.8	1344252.4	19.01	18.94	18.96	18.91	18.36	18.82
TOP OF CONC. FDN - WEST SIDE OF FIRE WATER TANK	1C	579921.2	1344219.2	19.01	18.95	18.97	18.92	18.32	18.81
TOP OF CONC. FDN - SOUTH SIDE OF FIRE WATER TANK	1D	579954.4	1344185.6	19.03	18.94	18.98	18.9	18.35	18.85
TOP OF CONC. SLAB - S.W. CNR. FIRE PUHPS PRD	3R	579929.1	1344269.4	18.59	18.52	18.54	18.52	17.95	18.4
rop OF CONC. SLRB - N.E. CNR. FIRE PUHPS PRD	3B	579956.7	1344282.8	18.62	18.55	18.57	18.5	17.98	18.44
TOP OF CONC. SLAB - N.W. CNR. METER RUN PAD	6R	580507.6	1344102.4	18.7	18.6	18.63	18.6	17.99	18.47
TOP OF CONC. SLAB - N.E. CNR. METER RUN PAD	6B	580507.6	1344128.7	18.67	18.59	18.6	18.57	17.96	18.44
rop OF CONC. SLRB - S.E. CNR. METER RUN PRD	6C	580388.9	1344132.6	18.72	18.63	18.65	18.63	18.03	18.5
TOP OF CONC. SLAB - S.W. CNR. METER RUN PAD	6D	580388.9	1344120.5	18.7	18.62	18.64	18.61	18.02	18.49
CENrERLINE EAST END OF PIPE SUPPORr #87	7	580723.6	1344091.9	15.79	15.7	15.74	15.7	15.08	15.58
CENrERLINE SOUrH END OF PIPE SUPPORr #96	8	580728.7	1344095.4	19.22	19.13	19.16	19.13	18.5	19
TOP OF CONC. SLAB - N.W. CNR BRINE SUMP PRD	11A	580499.5	1344151.9	23	22.9	22.93	22.92	22.25	22.77
TOP OF CONC. SLAB - N.E. CNR BRINE SUMP PRD	11B	580499.4	1344386.6	22.98	22.88	22.9	22.9	22.25	22.76
TOP OF CONC. SLRB - S.E. CNR BRINE SUMP PRD	11C	580470.2	1344375.7	22.98	22.88	22.9	22.88	22.24	22.74
TOP OF CONC. SLRB - S.W. CNR BRINE SUMP PRD	11D	580469.5	1344370.2	22.99	22.88	22.91	22.89	22.25	22.75
TOP OF CONC. SLRB - N.W. CNR BRINE FILrER PRD	13R	580548.9	1344398.1	18.82	18.72	18.75	18.73	18.1	18.59
TOP OF CONC. SLAB - N.E. CNR BRINE FILrER PRD	13B	580549	1344463.7	18.8	18.7	18.73	18.71	18.09	18.58
TOP OF CONC. SLRB - S.E. CNR BRINE FILrER PRD	13c	580524.2	1344463.7	18.81	18.71	18.73	18.72	18.1	18.59
TOP OF CONC. SLRB - S.W. CNR BRINE FILrER PRD	13D	580524.2	1344397.9	18.79	18.69	18.72	18.7	18.07	18.56
TOP OF CONC. SLRB - N.W. CNR SEPARATOR PRD	16R	580496.9	1344413.9	18.82	18.72	18.75	18.73	18.11	18.59
TOP OF CONC. SLAB - S.E. CNR SEPARATOR PRD	16B	580477	1344437.7	18.79	18.73	18.76	18.74	18.11	18.6
rop OF CONC. SLAB - S.W. CNR HELIPORT	17R	580622.3	1344605	15.83	15.73	15.75	15.73	15.11	15.61
TOP OF CONC. SLAB - N.E. CNR HELIPORT	17B	580643.6	1344623.3	15.84	15.74	15.76	15.74	15.11	15.61
TOP OF CONC. FDN - N.E. CNR SMP. 6	20R	580715.2	1344296.7	19.5	19.42	19.44	19.41	18.8	19.29
TOP OF CONC. FDN - S.W. CNR. SMP. 5	21B	580665.2	1344291.7	19.17	19.1	19.12	19.09	18.41	18.92
rop OF CONC. FDN - N.E. CNR. SMP. 7	22R	580715.1	1344266.7	19.55	19.46	19.48	19.45	18.83	19.32
TOP OF CONC. FDN - S.W. CNR. SMP. 4	23B	580665.2	1344261.7	19.15	19.1	19.13	19.1	18.47	18.97
TOP OF CONC. FDN - N.E. CNR. SMP. 8	24R	580715.2	1344236.7	19.54	19.44	19.46	19.44	18.82	19.31
rop OF CONC. FDN - S.W. CNR. SMP. 3	25B	580665.2	1344231.8	19.17	19.07	19.1	19.09	18.43	18.94
CENrERLINE NORTH END OF PIPE SUPPORr	26	580687.3	1344270.4	18.33	18.24	18.27	18.25	17.61	-
CENrERLINE SOUrH END OF PIPE SUPPORr #49	27	580728.4	1344215.3	19.14	19.05	19.07	19.06	18.42	-
TOP OF CONC. SLRB - CENTER OF FRONT DOOR OF CONT. RM BLDG.	28R	580870.3	1344288.1	18.48	18.39	18.41	18.39	17.74	18.24
TOP OF CONC. SLRB - CENTER OF WEST DBL DOOR OF CONT. RM BLDG	28B	580904.3	1344199.5	18.46	18.4	18.43	18.4	17.77	18.23
rop OF CONC. SLRB - S.E. CNR. EMERGENCY GENERATOR PRD	29R	580930	1344255.1	18.49	18.4	18.43	18.4	17.77	18.26
TOP OF CONC. SLRB - N.W. CNR. EMERGENCY GENERATOR PAD	29B	580943.3	1344233.6	18.5	18.39	18.42	18.4	17.77	18.27
TOP OF CONC. SLRB - S.W. CNR. ELECT. SUBSTATION	12R	---	---	---	---	---	18.41	17.78	18.27
TOP OF CONC. SLRB - N.E. CNR. ELECT. SUBSTATION	12B	---	---	---	---	---	18.45	18.13	18.33

Note: Above Survey Points Not Located Above Salt Done

** Elevation Measurements Not Used In Data Analysis

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SEA LEVEL) FROM SUBSIDENCE SURVEYS
D. Sulphur Mines SPR Site, 6 Surveys From 1/83 to 9/87

Location Of Survey Points Rnd Monuments	Point Name Or Number	North (Y) Coord Feet	East (X) Coord Feet	Survey Point Elevations Dates / Months From Initial Survey					
				1/83 0	8/83 7	2/84 13	3/85 26	9/86 44	9/87 56
Note: Only Following Points Are Located Above Salt Dome									
TOP OF MANHOLE RING - NORTH EDGE - WELL PRD 4	30	581971.8	1343928.8	19.24	19.07	19.09	18.99	18.3	18.7
TOP OF FLRNGE - S.W. EDGE	2	582328.6	1343447.7	16.12	15.93	15.95	15.83	15.16	15.52
TOP OF FLANGE - S.W. EDGE	2A	582273.9	1343501.8	16.21	16.05	16.07	15.95	15.26	15.63
TOP OF UPPER FLRNGE - NORTH EDGE	4	581919.2	1343889.3	18.8	18.65	18.68	18.58	17.92	18.31
TOP OF FLRNGE - NORTH EDGE	6X	583426.9	1343137.6	16.63	16.5	16.49	16.41	15.71	16.12
TOP OF FLANGE - NORTH EDGE	6Y	583407.3	1343114.5	16.59	16.44	16.44	16.36	15.69	16.08
TOP OF FLRNGE - EAST EDGE	62	583350	1343162.2	13.66	13.57	13.51	13.41	12.7	13.05
TOP OF FLANGE - EAST EDGE	7A	582934.1	1342799.2	15.9	15.75	15.82	15.77	15.1	15.52
TOP OF FLANGE - EAST EDGE	7B	582974	1342799.6	16.14	16	16.01	15.95	15.27	15.69
TOP OF FLANGE - SOUTH EDGE	7C	582970.6	1342876.4	14.09	13.94	13.97	13.9	13.1	13.6
TOP OF FLRNGE - WEST EDGE	5	581967.2	1343510.9	15.89	15.73	15.75	15.66	15.02	15.41
SUBSIDENCE MONUMENT SET BY PLT	sns 1	579874.2	1344150.5	16.53	16.48	16.5	16.46	15.9	16.39
SUBSIDENCE MONUMENT SET BY PLT	sns2	580602.6	1344234.8	15.67	15.61	15.64	15.64	14.99	15.49
SUBSIDENCE MONUMENT SET BY PLT (DAMAGED BEFORE 3/85 SURVEY)	sns3	582156.5	1343614.9	12.42	12.33	12.34	11.21**	---	10.89**
SUBSIDENCE MONUMENT SET BY PLT	sns4	582777.5	1343062.8	13.94	13.85	13.87	13.78	13.06	13.47
SUBSIDENCE MONUMENT SET BY PLT	sns5	583601.4	1342981-E	12.21	12.13	12.15	12.08	11.4:	11.84

TABLE I
SUMMARY OF ELEVATIONS (FEET ABOVE SEA LEVEL) FROM SUBSIDENCE SURVEYS

E. Weeks Island Mine SPR Site, 6 Surveys From 5/83 to 6/87

Location Of Survey Points And Monuments	Point Name Or Number	North (Y) Coord Feet	East (X) Coord Feet	Survey Point Elevations Dates / Months From Initial Survey					
				5/83 0	11/83 6	3/84 10	10/84 17	4/86 35	6/87 49
PRINTED SQRRE ON TOP OF CONC. RING FOUNDATION OF URTER TANK	1	415915.9	1850212.3	131.9	131.83	131.77	131.72	131.23	131.14
PRINTED SQUARE ON TOP OF CONC. RING FOUNDATION OF URTER TANK	2	415883.8	1850213.1	131.85	131.77	131.71	131.65	131.16	131.07
PRINTED SQRRE ON TOP OF CONC. RING FOUNDATION OF URTER TANK	3	415882.9	1850245.2	131.75	131.68	131.61	131.56	131.07	130.97
PRINTED SQUARE ON TOP OF CONC. RING FOUNDATION OF URTER TANK	4	415917.4	1850245.5	131.85	131.78	131.71	131.67	131.19	131.1
TOP OF N/U CORNER OF CONC. PEDESTAL FOUND. OF URTER CHILLER	6	414463.2	1849284.4	102.04	101.94	101.87	101.73	101.2	101.08
TOP OF S/E CORNER OF CONC. PEDESTAL FOUND. OF URTER CHILLER	7	414442.4	1849312.9	102.07	101.98	101.9	101.73	101.24	101.12
TOP OF STEEL RING ON NORTH SIDE OF FLRE STACK - STAMPED #15	8	414374.6	1849336.2	101.34	101.26	101.19	101.03	100.54	100.44
TOP OF CONC. FOUND., N/E CORNER OF UPOR RECOVERY UNIT	9	414379.9	1849257.9	100.25	100.18	100.11	99.97	99.47	99.37
TOP OF CONC. FOUND., S/U CORNER OF VAPOR RECOVERY UNIT	10	414367.7	1849236.7	100.27	100.17	100.11	99.98	99.49	99.39
WEST SIDE OF TOP FLRNGE AT OIL SUMP - STAMPED #51 BY OTHERS	11	414365.5	1849212	100.07	99.97	99.91	99.78	99.29	99.2
TOP OF CONC. FIR S/E CORNER OF INSPECTION POND	12	414321.4	1849184.2	99.16	99.08	99.02	98.89	98.43	98.35
CENTERLINE DOORRY INTO SHOP BUILDING	13	414442	1849074	100.2	100.11	100.05	99.93	99.43	99.31
CENTERLINE DOORRY INTO OFFICE BUILDING	15	414493.5	1849080	100.2	100.12	100.05	99.77	99.27	99.16
TOP OF RETAINING WALL NERR S/U CORNER OF METER PROVER LOOP	22	414399.9	1848953.2	101.59	101.55	101.48	101.38	100.9	100.83
TOP OF RETAINING WALL AT N/E CORNER OF METER PROVER Loop	23	414459	1848985.2	101.14	101.08	101.01	100.89	100.39	100.31
"X" ON TOP OF VERTICAL FLRNGE ON NORTH SIDE OF TEE	29	413692.9	185009 1	71.58	71.52	71.46	71.42	71.07	71.09
"+" ON top OF top FLANGE NORTH SIDE STAMPED #68	30	413709.3	1849988.3	70.03	69.97	69.91	69.87	69.54	69.56
BOAT SPIKE SET TOP OF S SIDE OF CONC. COLLAR AT PROD- SHAFT	35	415227. 1	1848103.1	77.75	77.67	77.62	77.49	77.19	77.2
SUBSIDENCE MONUMENT SET BY PLT	sns1	415877.5	1850127.5	130.34	130.27	130.22	130.15	129.67	129.57
SUBSIDENCE MONUMENT SET BY PLT	SM52	413780	1849951.4	65.83	65.75	65.69	65.64	65.28	65.26
SUBSIDENCE MONUMENT SET BY PLT	sns3	415350.1	1851491.5	37.38	37.39	37.38	37.21	37.03	37.02
BRRSS DISK SET TOP OF S SIDE OF CONC. COLLAR AT SERV. SHAFT	sns4	414386.5	1848213.1	54.22	54.13	54.09	53.93	53.69	53.7
SUBSIDENCE MONUMENT SET BY PLT	sns5	415024.7	1847866.6	---	---	44.73	44.56	44.35	---

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TABLE II
RESULTS OF LINERR REGRESSIONS OF ELEVATION vs MONTH DATA FOR ERCH INDIUDURL SURVEY POINT
A. West Hackberry SPR Site, 6 Surveys From 1/83 to 12/87

REGRESSION RESULTS								REGRESSION RESULTS							
Point Name or Number	North (Y) Coord	East (X) Coord	Subsidence Rate	Standard Error	Point Name or Number	North (Y) Coord	East (X) Coord	Subsidence Rate	Standard Error						
	Feet	Feet	Ft/ftlonth	Ft/Year		Feet	Feet	Ft/ftlonth	Ft/Year						
	19728.6	4495.5	-0.016954	-0.203459	0.000794	0.040596	UELL 101	20291.5	3965.7	-0.018838	-0.226058	0.000771	0.039399		
2	19744-E	4535.3	-0.017601	-0.211212	0.000712	0.036427	UELL 103	21015.3	3959	-0.021017	-0.252210	0.001815	0.092776		
3	20079.1	4410.6	-0.018425	-0.221101	0.001124	0.057463	UELL 105	19515.4	3957.9	-0.016603	-0.199246	0.000771	0.039437		
4	20222.5	4409.9	-0.018593	-0.223124	0.000596	0.030495	UELL 107	21390.2	3349.5	-0.023946	-0.287356	0.001057	0.054019		
5	20289.5	4318.2	-0.017968	-0.215616	0.000584	0.029877	WELL 108	18186	4764.3	-0.009320	-0.111841	0.000548	0.028032		
6	20304 .8	4310.6	-0.018654	-0.223859	0.000550	0.028106	UELL 109	21764.5	3960.3	-0.021577	-0.258928	0.000794	0.040580		
7	20470 .1	4425.1	-0.019547	-0.234568	0.000674	0.034454	WELL 110	22514.5	3957.6	-0.021603	-0.259242	0.000897	0.045879		
B	20470 .2	4521.7	-0.018930	-0.227168	0.000670	0.034272	UELL 113	22501.6	2659.8	-0.022522	-0.270266	0.001569	0.080220		
9	20450 .8	4590.1	-0.018582	-0.222993	0.000702	0.035904	UELL 114	21764.6	2659.6	-0.022457	-0.269492	0.001612	0.082406		
10	20410.1	4606	-0.018361	-0.220335	0.000445	0.022762	UELL 115	22139.3	3307.4	-0.025442	-0.305304	0.001251	0.063954		
11	20407.9	4885	-0.015945	-0.191341	0.000619	0.031644	BM 1	18640.6	4900	-0.011495	-0.137940	0.000595	0.030404		
12	20369.8	4884.8	-0.016186	-0.194236	0.000646	0.033025	BM 4	20600	4400	-0.018455	-0.221469	0.000485	0.024787		
13	20349	4874.1	-0.016238	-0.194857	0.000673	0.034406	BM 5	21300.1	4900.4	-0.017924	-0.215088	0.000630	0.032203		
14	20320 .8	4823.8	-0.016322	-0.195868	0.000743	0.037986	BM 8	19308.1	4435.1	-0.014923	-0.179076	0.000558	0.028527		
15	20291	4874.1	-0.016205	-0.194466	0.000701	0.035857	BM 11	18977.7	4583.9	-0.012668	-0.152020	0.000644	0.032953		
16	20270.6	4823.7	-0.016470	-0.197645	0.000969	0.049561	BM 12	18977.9	3578.6	-0.013941	-0.167295	0.000637	0.032574		
17	20242 .1	4772.6	-0.015849	-0.190199	0.000676	0.034585	BM 13	19758	3579.1	-0.015036	-0.180440	0.000631	0.032277		
18	20 154	4880.2	-0.016045	-0.192551	0.000699	0.035757	BM 14	20398 .6	3579.1	-0.019604	-0.235258	0.000609	0.031127		
19	20138.1	4880.1	-0.015829	-0.189954	0.000669	0.034183	BM 15	2 1300	3579.1	-0.021861	-0.262337	0.000904	0.046241		
21	19996.2	4880	-0.015715	-0.188583	0.000705	0.036061	sns 1	18209.9	5035.3	-0.009249	-0.110991	0.000529	0.027058		
22	19961.8	4823.6	-0.016128	-0.193539	0.000715	0.036561	sns 2	19731.1	4955.9	-0.016007	-0.192084	0.000765	0.039125		
23	19926.2	4880	-0.015625	-0.187503	0.000672	0.034339	sns 4	21829.9	4875.7	-0.018303	-0.219646	0.001114	0.056947		
24	19891.8	4823.6	-0.016107	-0.193294	0.000778	0.039789	sns 5	22103.2	1727	-0.018864	-0.226372	0.000927	0.047388		
25	19770.2	5480.1	-0.015419	-0.185036	0.000777	0.039720	sns 6	20968.9	3521.9	-0.020591	-0.247101	0.000734	0.037535		
27	20488.8	5480.3	-0.017800	-0.213602	0.000526	0.026921	sns 7	19379.4	3371.5	-0.015817	-0.189809	0.000581	0.029691		
29	21183.4	4551.8	-0.019963	-0.239563	0.000767	0.039199	20	20049.9	4772.5	-0.015680	-0.188168	0.000707	0.036153		
31	21039	4550.9	-0.020156	-0.241876	0.000733	0.037481	26	20127.9	4920.1	-0.016249	-0.194993	0.001412	0.069782		
33	20823-E	4552.9	-0.019602	-0.235235	0.000546	0.027936	UELL 7	22031.2	6083.9	-0.013415	-0.160987	0.000371	0.016062		
35	20823.4	4508.9	-0.019852	-0.238230	0.000578	0.029551	UELL 7R	22 104	6084.2	-0.015276	-0.183322	0.001386	0.059962		
37	21038.9	4508.2	-0.020236	-0.242834	0.000852	0.043553	UELL 78	22019.4	6134	-0.013466	-0.161603	0.001647	0.071258		
39	21188.8	4508.2	-0.019759	-0.237112	0.000740	0.037855	UELL 9A	21583.4	4761.1	-0.02135	-0.25624	0.001276	0.036222		
UELL 6	22433.8	4959.3	-0.017138	-0.205658	0.000847	0.043304	UELL 9B	21716.1	4695.3	-0.021501	-0.25803	0.001491	0.042315		
UELL 6R	22298 .3	4959	-0.017761	-0.213135	0.000931	0.047603	UELL 102	20640 .5	3343.5	-0.021102	-0.253231	0.000624	0.029494		
UELL 6B	22343	5108.6	-0.016174	-0.194091	0.000811	0.041444	UELL 104	19890.7	3335.1	-0.017572	-0.210866	0.000341	0.016133		
UELL 6C	22343 .1	4805.5	-0.018347	-0.220167	0.000897	0.045876	UELL 106	19139.5	3258.7	-0.015770	-0.189249	0.001052	0.045528		
WELL 8	21308	5282.3	-0.01509	-0.18109	0.001201	0.041793	UELL 111	22870 .1	3308.9	-0.021203	-0.254441	0.000877	0.044800		
UELL 8R	21324.3	5329.3	-0.016549	-0.198595	0.000875	0.044724	UELL 112	18185.7	5514.1	-0.009863	-0.118357	0.001561	0.067540		
UELL 8B	21341.7	5376.9	-0.014506	-0.174074	0.001069	0.054622	UELL 116	21828.5	1911.2	-0.020484	-0.245811	0.001379	0.059669		
UELL 9	21727	4819.5	-0.01943	-0.23325	0.001437	0.049992	BM 3	20599.9	4899.9	-0.016178	-0.194136	0.002324	0.044403		
UELL 11	18925.1	5109.3	-0.010742	-0.128909	0.000574	0.029343	sns 3	21695.5	6338	-0.010350	-0.124203	0.000872	0.044571		
UELL 11A	18974.5	5107.8	-0.010594	-0.127131	0.000716	0.036609	BM 7R	22099.6	4 900 .3	-0.013077	-0.156924	-----	-----		
UELL 11B	18876.8	5111.6	-0.010353	-0.124236	0.000645	0.033007	BM 9	19798.3	4 395	-0.013846	-0.166152	-----	-----		

Averages = -0.017097 -0.20517 0.000858 0.040903

TABLE II
RESULTS OF LINEAR REGRESSIONS OF ELEVATION vs MONTH DATA FOR ERCH INDIVIDUAL SURVEY POINT
B. Bryan Hound SPR Site, 6 Surveys From 12/82 to 9/87

REGRESSION RESULTS							REGRESSION RESULTS						
Point Name or Number	North (Y) Coot-d	East (X) Coot-d	Subsidence Rate	Standard Error	Point Name or Number	North (Y) Coord	East (X) Coot-d	Subsidence Rate	Standard Error				
	Feet	Feet	Ft./Month	Ft./Year		Feet	Feet	Ft./Month	Ft./Year				
6A	51232.3	200524.7	-0.003305	-0.039667	0.000401	0.020354	UELL 106C	50955.1	203821.4	-0.006201	-0.074416	0.000939	0.047631
6C	51236.6	200498.9	-0.002160	-0.025921	0.001116	0.056593	UELL 107B	51298.4	203148.8	-0.003395	-0.040742	0.000628	0.031882
7A	51742.9	201279.6	-0.002432	-0.029190	0.000368	0.018685	UELL 108A	51698.4	203764.8	-0.003706	-0.044478	0.000653	0.033108
78	51861.5	201152.9	-0.002615	-0.031385	0.000415	0.021059	UELL 108B	51762.6	203727.5	-0.003078	-0.036943	0.000623	0.031615
7c	51833.9	201374.7	-0.002738	-0.032864	0.000377	0.019117	UELL 109R	50599.5	203035.6	-0.003729	-0.044758	0.001172	0.059452
7D	51962.6	201290.8	-0.001783	-0.021406	0.000389	0.019731	UELL 109B	50534.5	202998.2	-0.003308	-0.039699	0.000674	0.034204
8A	51743	200835.2	-0.002642	-0.031712	0.000540	0.027413	UELL 109C	50600.4	202960.7	-0.003077	-0.036927	0.000650	0.032984
88	51859.8	200708.8	-0.000609	-0.007317	0.000385	0.019545	UELL 110A	51030.3	202496.3	-0.003209	-0.038515	0.000563	0.028567
8C	51831.8	200930.4	-0.002939	-0.035277	0.000449	0.022792	UELL 110B	50992.4	202430.8	-0.003981	-0.047778	0.000625	0.031695
8D	51965	200834.2	-0.002576	-0.030918	0.000548	0.027808	UELL 110C	51067.8	202430.4	-0.003226	-0.038718	0.000544	0.027623
9A	51742.8	200389.9	-0.002549	-0.030591	0.000583	0.029589	sns 13	51781.6	201849.1	-0.003127	-0.037535	0.000521	0.026435
98	51859.7	200264.6	-0.000714	-0.008578	0.000572	0.029027	SMS 18	53100.2	201250	-0.002362	-0.028349	0.000701	0.035565
9c	51842.7	200487.8	-0.002778	-0.033347	0.000430	0.021842	sns 19	52659.5	201000.2	-0.002515	-0.030186	0.000656	0.033257
9D	51965.2	200384.3	-0.002437	-0.029252	0.000655	0.033222	sns 20	52577.5	201249.8	-0.002502	-0.030031	0.000819	0.041558
10R	51743	199947.3	-0.002095	-0.025142	0.000424	0.021529	SMS 24	51499.9	200559.3	-0.003348	-0.040181	0.000403	O-020465
108	51859.6	199821.1	0.0000856	0.0010275	0.000723	0.036678	SMS 25	51983.4	200559.8	-0.002527	-0.030326	0.000509	0.025850
10C	51842.6	200044.2	-0.002467	-0.029610	0.000567	0.028747	SMS 28	51327.7	203717.1	-0.003345	-0.040150	0.000732	0.037148
10D	51965.8	199939.5	-0.002717	-0.032615	0.000512	0.025994	SMS 29	52029.8	203131.5	-0.003160	-0.037924	0.000678	0.034416
11R	52237.5	201083.2	-0.001041	-0.012501	0.000650	0.032957	sns 30	53564.9	203486.1	-0.001209	-0.014509	0.000573	0.029055
118	52238.7	200724.1	-0.000596	-0.007161	0.000593	0.030076	sts 31	52851.2	202413.6	-0.002861	-0.034343	0.000471	0.023918
11C	52500.9	200723	-0.000996	-0.011956	0.000711	0.036053	12B	52541	201932.5	-0.003733	-0.044802	0.000877	0.032449
11D	52499.8	201088.1	-0.001471	-0.017654	0.000686	0.034780	12c	52638.5	201932.4	-0.003452	-0.041434	0.001253	0.063476
13A	52126.5	202078.7	-0.002816	-0.033798	0.000430	0.021799	UELL 111C	54009.5	203680	-0.001467	-0.017611	0.001670	0.050520
138	52227	202013.8	-0.003194	-0.038329	0.000225	0.011407	UELL 1048	52737.7	202701.7	-0.002791	-0.033499	0.000490	0.021961
WELL 1	51782.1	202595.3	-0.002697	-0.032366	0.000612	0.031058	UELL 106B	50954.6	203747.3	-0.006105	-0.073265	0.001245	0.046046
WELL 1A	51779.5	202489.3	-0.003003	-0.036040	0.000843	0.042741	UELL 107R	51363.3	203111.5	-0.003733	-0.044801	0.000723	0.036668
WELL 2	50834.4	201746.6	-0.002546	-0.030560	0.000443	0.022468	UELL 107C	51298.4	203073.8	-0.003552	-0.042625	0.000762	0.035822
UELL 2A	50830.4	201677.9	0.0018629	0.0223559	0.001200	0.060860	UELL 108C	51761.2	203801.4	-0.003842	-0.046110	0.000286	0.014518
UELL 4R	51772.3	201609.9	0.0037999	0.0455993	0.001627	0.082512	UELL 112A	S0328	202330.1	-0.004385	-0.052622	0.000677	0.031859
UELL 48	51849.3	201677.4	-0.003799	-0.045599	0.000444	0.022545	UELL 112C	50253.8	202318.6	-0.005459	-0.065519	0.001122	0.039126
UELL 4C	51720.1	201677.7	-0.003129	-0.037550	0.000445	0.022589	sns 1	51715.5	199794.1	-0.001655	-0.019860	O-000132	0.005924
UELL S	52819.9	201247	-0.002368	-0.028427	0.000632	0.032071	sts 2	51479.7	200042	-0.001511	-0.018139	0.000201	O-001867
UELL 5A	52760.1	201295	-0.002288	-0.027462	0.000650	0.032952	sts 4	50652.9	201192.4	0.0005813	0.0069767	0.004363	O-040467
UELL 5C	53033.6	201166.4	-0.000707	-0.008484	0.000776	0.039366	sns 5	50677.6	201604.9	-0.002956	-0.035473	0.000507	0.022731
UELL 101A	53228.2	202101.3	-0.002785	-0.033425	0.000789	0.039996	STS 6	51179	201604.5	-0.003210	-0.038524	O-000637	0.028549
UELL 101C	53190	202165.8	-0.003314	-0.039776	0.000690	0.035010	sts 9	51660.3	202078.8	-0.003105	-0.037268	0.000566	O-025374
WELL 1028	53494.3	203008.4	-0.002224	-0.026699	0.000636	0.032264	sns 10	51689.7	202589.5	-0.002870	-0.034451	0.000949	0.042049
UELL 102C	53569.8	203009.3	-0.001503	-0.018043	0.000633	0.032110	sns 12	51859.9	202278	-0.002966	-0.035593	0.000527	0.023605
UELL 111B	54008.1	203757.8	-0.001046	-0.012563	0.000649	0.032915	sns 14	51693.9	201587.2	-0.003723	-0.044685	0.000525	0.023544
UELL 1038	53280.6	203691.1	-0.001059	-0.012719	0.000623	0.031610	sns 15	51711.7	201490.2	-0.002209	-0.026511	0.000738	0.006848
UELL 103C	53280.3	203766.2	-0.001526	-0.018323	0.000734	0.037223	STS 16	52221.1	201705.5	0.0008139	0.0097674	0.006109	0.056654
UELL 104A	52689.1	202643.9	-0.003437	-0.041255	0.000414	0.021002	sns 17	52745.2	201499.9	0.0036046	0.0432558	0.003960	0.036731
UELL 104C	52665	202713.8	-0.003187	-0.038251	0.000318	0.016152	sns 21	51984.4	201249.8	-0.001395	-0.016744	0.001074	0.009961
UELL 105B	52315.2	203338.2	-0.002428	-0.029143	0.000672	0.034078	sns 22	51982.8	200998.8	-0.001395	-0.016744	0.001074	0.009961
WELL 105C	52302.4	203264	-0.002907	-0.034888	0.000766	0.038832							
UELL 106A	50889.2	203784.5	-0.003640	-0.043684	0.000578	0.029298							

Averages = -0.002448 -0.029385 0.000804 0.031344

TABLE II
RESULTS OF LINERR REGRESSIONS OF ELEVATION vs MONTH DRTR FOR ERCH INDIUDURL SURVEY POINT
D. Sulphur Hines SPR Site, 6 Surveys From 1/83 to 9/87

Point Name or Number	REGRESSION RESULTS						Point Name or Number	REGRESS1 ON RESULTS					
	North (Y) Coord Feet	East (X) Coord Feet	Subsidence	Rate	Standard Error	t		North (Y) Coord Feet	East (X) Coord-d Feet	Subsidence	Rate	Standard Error	t
1A	573988	1344218.8	-0.003157	-0.037889	0.000507	0.024950	30	581971.8	1343928.8	-0.008674	-0.104088	0.000848	0.041704
1B	579954.8	1344252.4	-0.002802	-0.033629	0.000469	0.023071	2	582328.6	1343447.7	-0.009414	-0.112972	0.001002	0.049258
1C	579921.2	1344219.2	-0.003371	-0.040458	0.000329	0.016203	2R	582273.9	1343501.8	-0.009406	-0.112872	0.000819	0.040255
1D	579954.4	1344185.6	-0.002792	-0.033513	0.000608	0.029901	4	581919.2	1343889.3	-0.007792	-0.093513	0.000822	0.040393
3A	579929.1	1344269.4	-0.002700	-0.032403	0.000546	0.026863	6%	583426.9	1343137.6	-0.008430	-0.101171	0.000605	0.029756
38	579956.7	1344282.8	-0.002603	-0.031243	0.000568	0.027946	6Y	583407.3	1343114.5	-0.008084	-0.097011	0.000776	0.038164
6R	580507.6	1344102.4	-0.003506	-0.042082	0.000598	0.029382	62	583350	1343162.2	-0.010330	-0.123961	0.000500	0.024598
68	580507.6	1344128.7	-0.003650	-0.043806	0.000436	0.021439	7R	582934.1	1342799.2	-0.005823	-0.069878	0.001079	0.053028
6C	580388.9	1344132.6	-0.003277	-0.039331	0.000559	0.027495	7B	582974	1342799.6	-0.007190	-0.086287	0.000754	0.037088
6D	580388.9	1344120.5	-0.003183	-0.038204	0.000479	0.023568	5	581967.2	1343510.9	-0.007421	-0.089055	0.000877	0.043113
7	580723.6	1344091.9	-0.003403	-0.040839	0.000574	0.028199	SMS4	582777.5	1343062.8	-0.008154	-0.097856	0.000713	0.035055
8	580728.7	1344095.4	-0.003569	-0.042828	0.000570	0.028025	SHS5	583601.4	1342981.8	-0.006288	-0.075464	0.000579	0.028470
11A	580499.5	1344151.9	-0.003819	-0.045828	0.000770	0.037862	7c	582970.6	1342876.4	-0.008008	-0.096100	0.001139	0.050294
11B	580499.4	1344386.6	-0.003477	-0.041734	0.000715	0.035150	SMS3	582156.5	1343614.9	-0.006338	-0.076062	0.004159	0.038274
11C	580470.2	1344375.7	-0.003835	-0.046027	0.000625	0.030733	Note: Only Following Points Are Located Above Salt Done						
11D	580469.5	1344370.2	-0.003763	-0.045165	0.000701	0.034443	Averages = -0.007954 -0.095449 0.001048 0.039246						
13A	580548.9	1344398.1	-0.003581	-0.042977	0.000641	0.031532							
138	580549	1344463.7	-0.003368	-0.040425	0.000628	0.030869							
13c	580524.2	1344463.7	-0.003321	-0.039861	0.000631	0.031037							
13D	580524.2	1344397.9	-0.003581	-0.042977	0.000641	0.031532							
16R	580496.9	1344413.9	-0.0035	-0.042	0.000637	0.031304							
16B	580477	1344437.7	-0.003178	-0.038138	0.000540	0.026567							
17R	580622.3	1344605	-0.003410	-0.040922	0.000600	0.029512							
17B	580643.6	1344623.3	-0.003622	-0.043475	0.000611	0.030028							
20R	580715.2	1344296.7	-0.003346	-0.040160	0.000461	0.022656							
21B	580665.2	1344291.7	-0.004472	-0.053668	0.000632	0.031070							
22R	580715.1	1344266.7	-0.003660	-0.043922	0.000519	0.025501							
23B	580665.2	1344261.7	-0.003165	-0.037988	0.000494	0.024308							
24R	580715.2	1344236.7	-0.003541	-0.042497	0.000599	0.029435							
25B	580665.2	1344231.8	-0.003737	-0.044850	0.000736	0.036183							
28R	580870.3	1344288.1	-0.003947	-0.047370	0.000604	0.029692							
28B	580904.3	1344199.5	-0.003791	-0.045497	0.000585	0.028759							
29R	580930	1344255.1	-0.003700	-0.044403	0.000571	0.028091							
29B	580943.3	1344233.6	-0.003551	-0.042613	0.000687	0.033789							
SHS1	579874.2	1344150.5	-0.002200	-0.026403	0.000299	0.014718							
SHS2	580602.6	1344234.8	-0.003033	-0.036397	0.000671	0.032967							
26	580687.3	1344270.4	-0.003545	-0.042545	0.001010	0.035166							
27	580728.4	1344215.3	-0.001570	-0.018842	0.000952	0.033148							

Averages = -0.003361 -0.040340 0.000600 0.028766

Note: Rbove Survey Points Are Not Located Rbove Salt Done

TABLE II
 RESULTS OF LINEAR REGRESSIONS OF ELEVATION vs MONTH DTR FOR EACH INDIVIDUAL SURVEY POINT
 E. Weeks Island Mine SPR Site, 6 Surveys From 5/83 to 6/87

Point Name or Number	REGRESSION RESULTS					
	North (Y) Coord Feet	East (X) Coord Feet	Subsidence Rate Ft/Month	Ft/Year	Standard Error Elev, Ft	t
1	415915.9	1850212.3	-0.009423	-0.113082	0.000467	0.019655
2	415883.8	1850213.1	-0.009773	-0.117287	0.000545	0.022965
3	415882.9	1850245.2	-0.009776	-0.117321	0.000484	0.020382
4	415917.4	1850245.5	-0.009115	-0.109386	0.000527	0.022169
6	414463.2	1849284.4	-0.013619	-0.163435	0.000912	0.038403
7	414442.4	1849312.9	-0.013399	-0.160791	0.001202	0.050588
8	414374.6	1849336.2	-0.012528	-0.150347	0.001125	0.047345
9	414379.9	1849257.9	-0.012192	-0.146312	0.000937	0.039451
10	414367.7	1849236.7	-0.011842	-0.142107	0.000945	0.039772
11	414365.5	1849212	-0.011675	-0.140107	0.001002	0.042175
12	414321.4	1849184.2	-0.010525	-0.126306	0.000997	0.041965
13	414442	1849074	-0.012079	-0.144956	0.000701	0.029496
1s	414493.5	1849080	-0.015832	-0.189985	0.001987	0.083584
22	414399.9	1848953.2	-0.009892	-0.118711	0.000780	0.032836
23	414459	1848985.2	-0.011268	-0.135224	0.000892	0.037533
29	413692.9	1850091	-0.003679	-0.044148	0.001101	0.046322
30	413709.3	1849988.3	-0.003170	-0.038044	0.001136	0.047821
35	415227.1	1848103.1	-0.004769	-0.057236	0.001709	0.071897
SMS1	415877.5	1850127.5	-0.009629	-0.115558	0.000383	0.016131
SMS2	413780	1849951.4	-0.005060	-0.060729	0.001065	0.044807
SMS3	415350.1	1851491.5	-0.001274	-0.015292	0.001684	0.070845
SMS4	414386.5	1848213.1	-0.003888	-0.046657	0.002060	0.086674
SMS5	415024.7	1847866.6	-0.014498	-0.173987	0.002759	0.050330

Averages = -0.009518 -0.114218 0.001104 0.043615

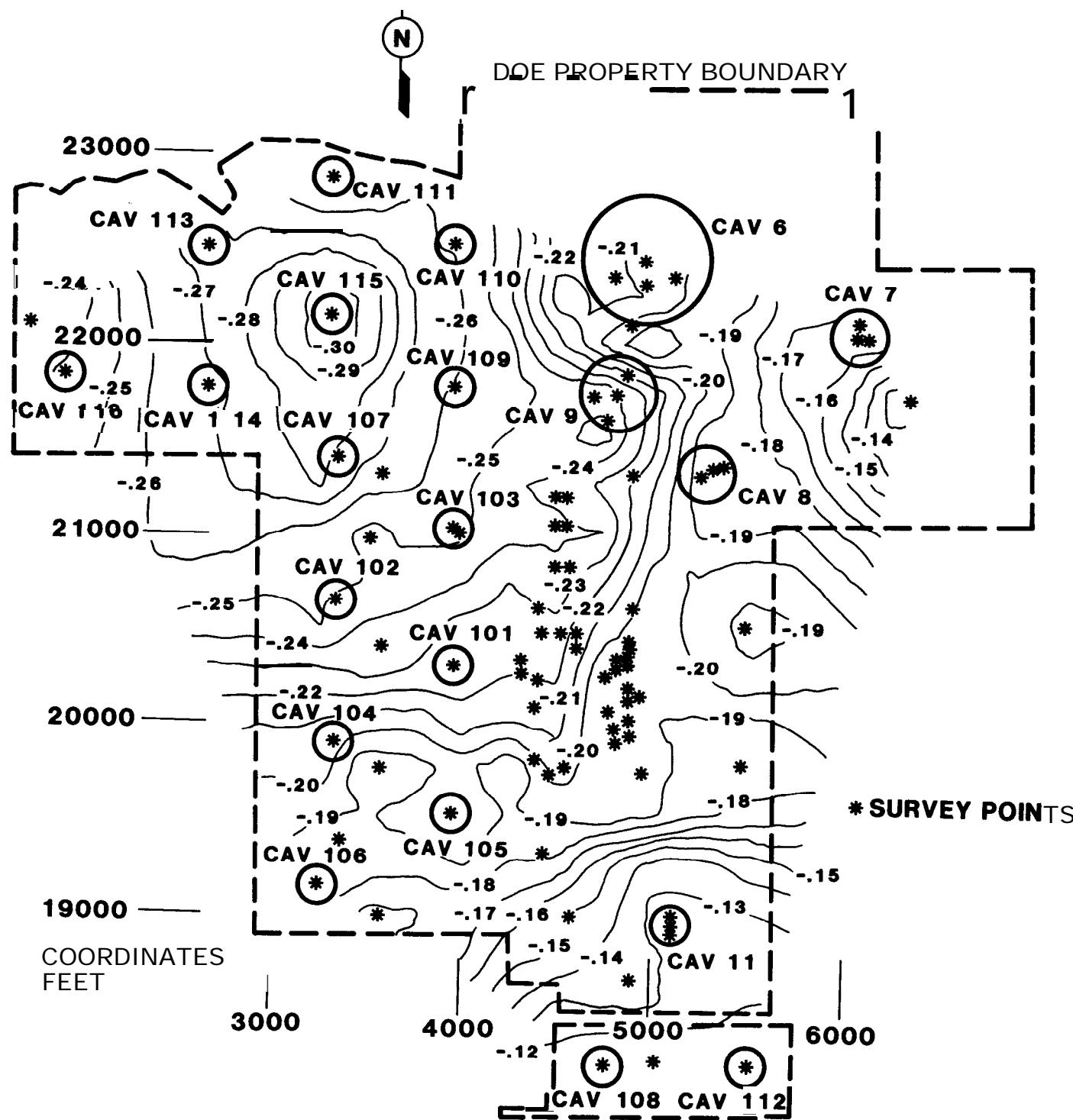


Figure 1. Contours of Subsidence Rate in ft/yr for the West Hackberry SPR Site, Six Surveys from 1/83 to 12/87.

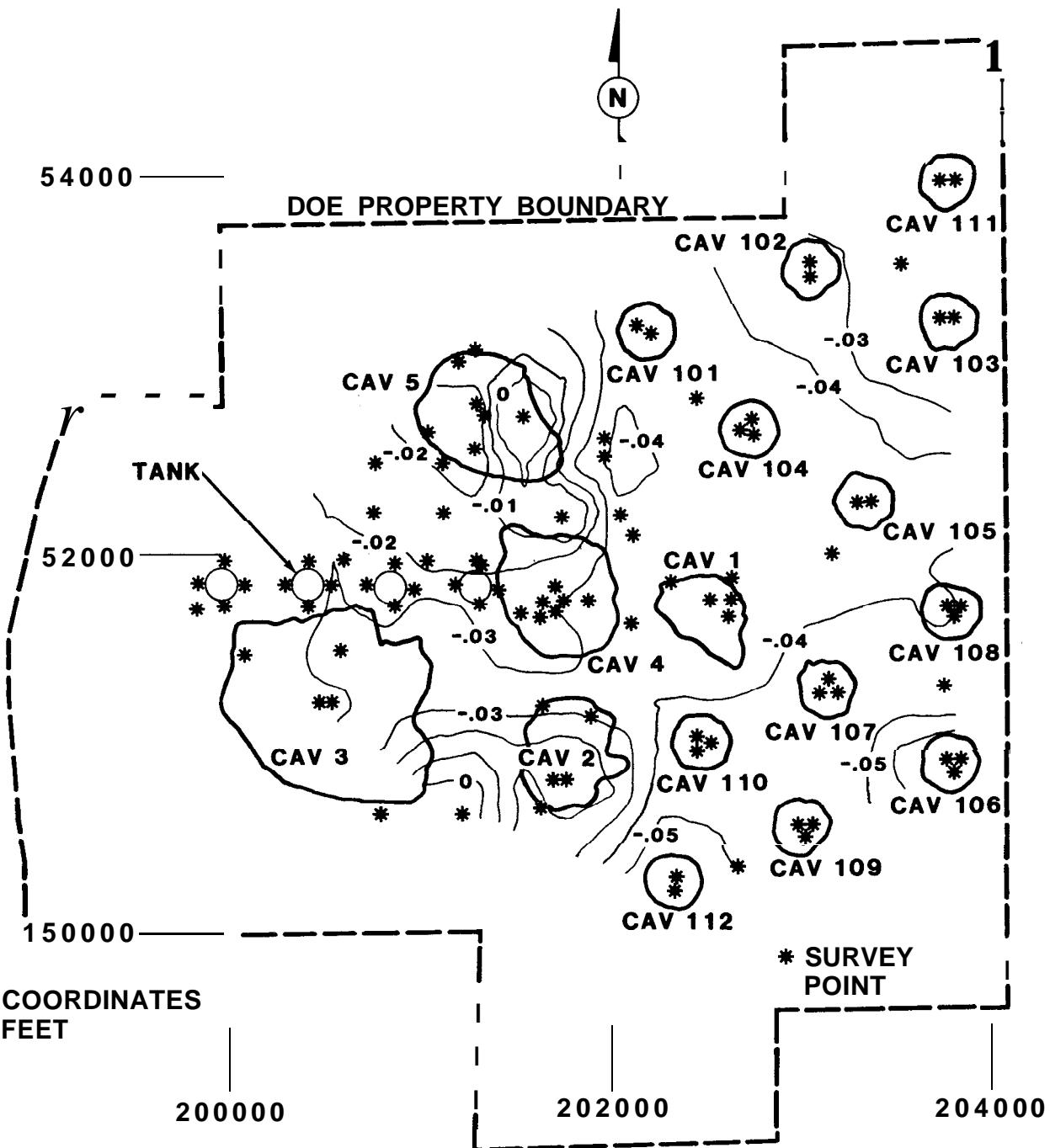


Figure 2. Contours of Subsidence Rate in ft/yr for the Bryan Mound SPR Site, Six Surveys from 12/82 to 9/87.

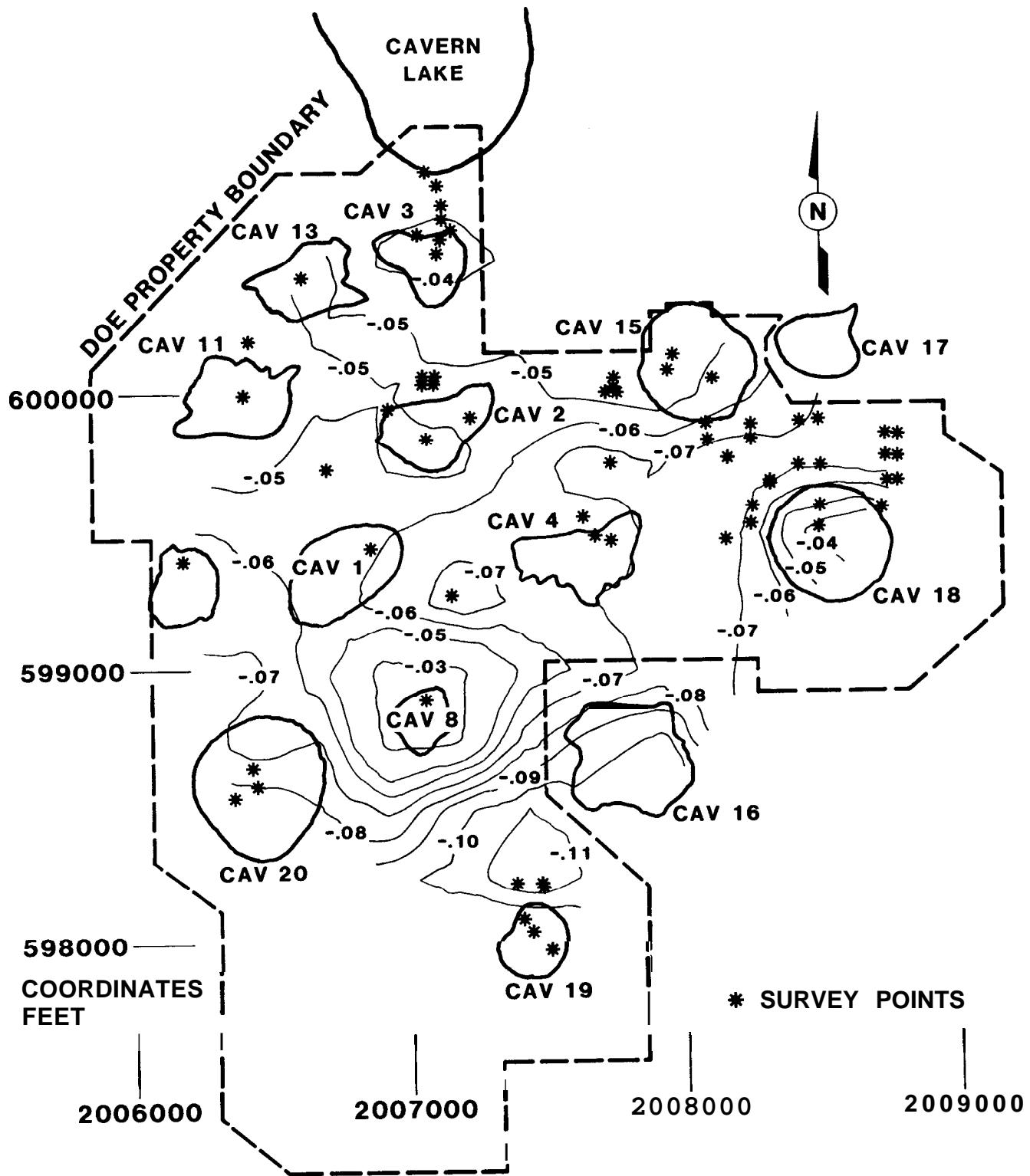


Figure 3. Contours of Subsidence Rate in ft/yr for the Bayou Choctaw SPR Site, Six Surveys from 12/82 to 1/88.

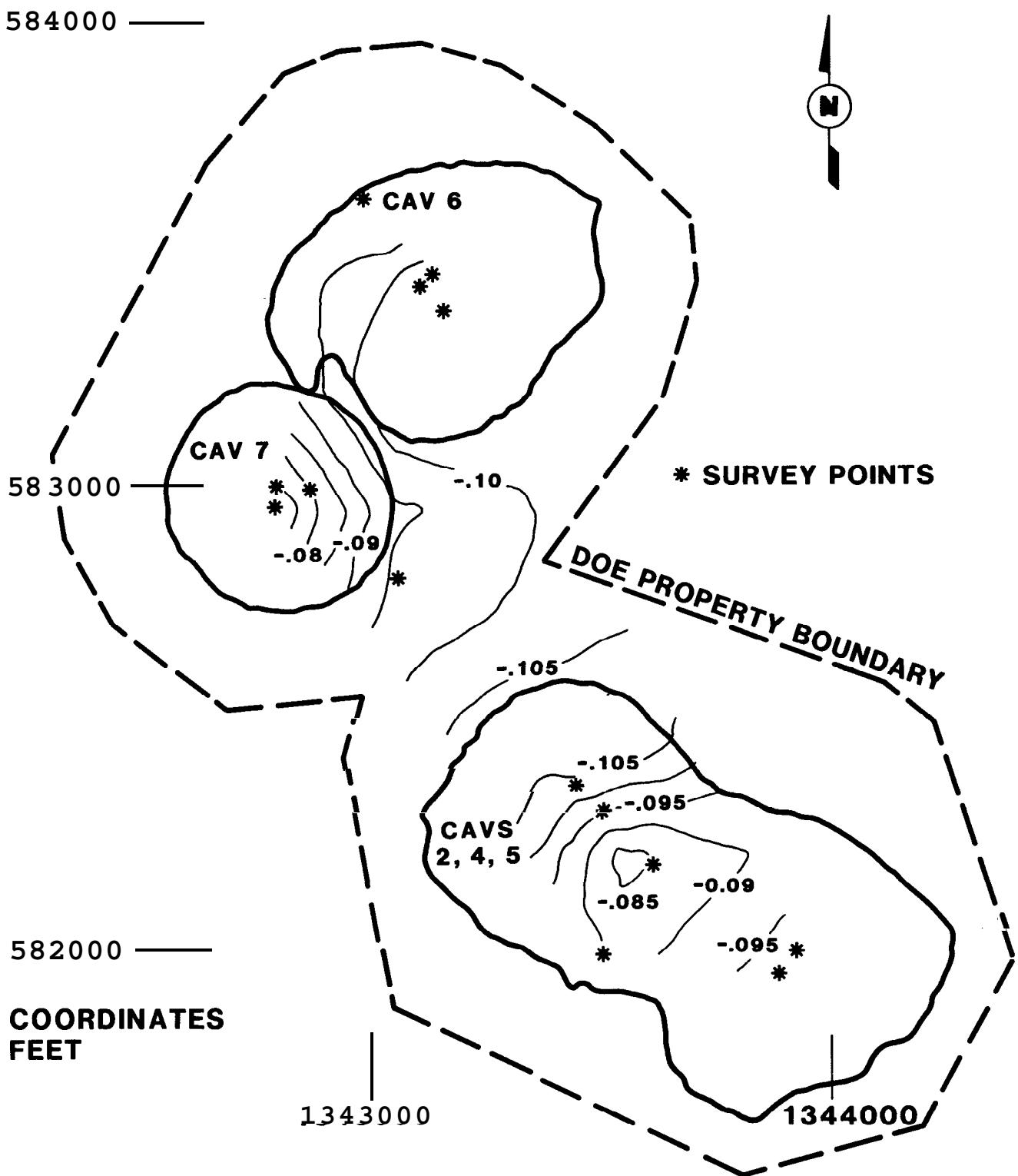


Figure 4. Contours of Subsidence Rate in ft/yr for the Sulphur Mines SPR Site, Six Surveys from 1/83 to 9/87.

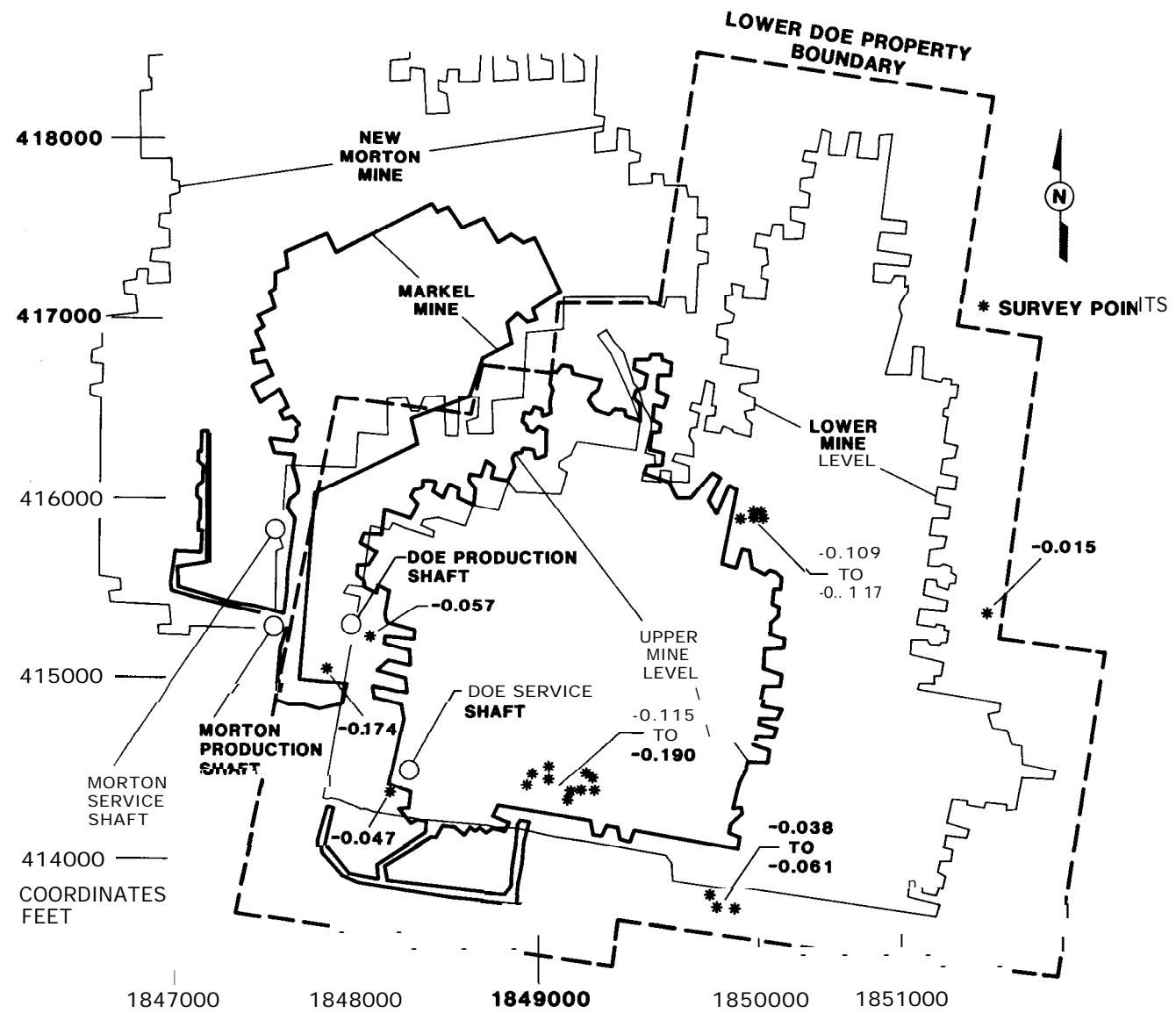


Figure 5. Subsidence Rates in ft/yr at Locations of Elevation Survey Points for the Weeks Island Mine SPR Site, Six Surveys from 5/83 to 6/87.